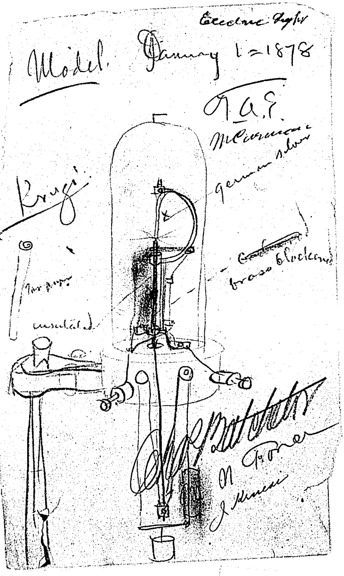
Notebook, Volume 16

This volume covers the period January 1878-December 1879. Most of the notes and drawings are by Edison, Charles Batchelor, and John Kruesi; a few are by John Ott and John K. Knight. Many have been witnessed by members of the laboratory staff and notarized by Stockton L. Griffin. All of the material relates to electric lighting except for a telephone drawing on page 376. Much of the electric light material for September and October 1878 has been copied into Experimental Researches, Vol. 1. The volume consists of 437 numbered, unbound leaves.

Pages found in Laboratory Scrapbook, Cat. 1146 (Miscellaneous Shop and Laboratory Notebooks): 76, 369, 387, 388, 399.

Missing pages: 80, 142, 160, 171, 306, 313, 369.



Electric Light

Model. January 1 = 1878

T.A.E.

McCormick german silver

Krusi

~~carbon~~ brass blocked

for paper

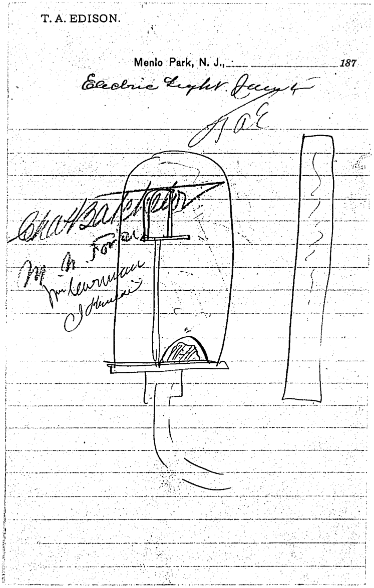
insulated

Chas Batchelor

M N Force

J Kruesi

1



T. A. EDISON.

Menlo Park, N. J., ______ 187

Electric Light Jan 4

T A E

Chas Batchelor

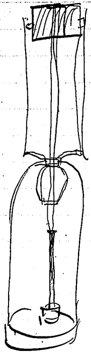
M N Force

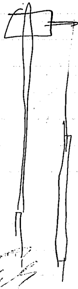
Jno McCormick

J Kruesi

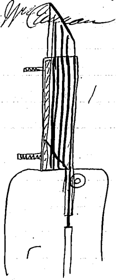
2

Electric Light
Jan 13, 1878

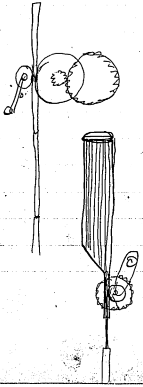


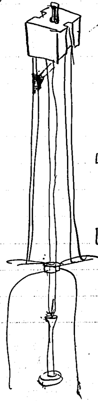


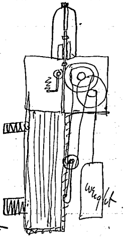
Chas Batchelor
M N Force
Wm Carman



J Johnson

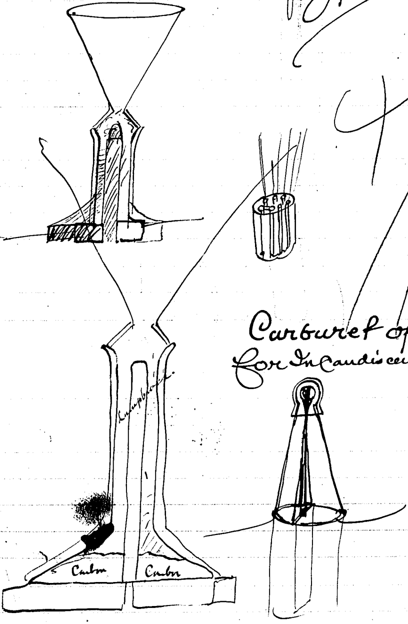




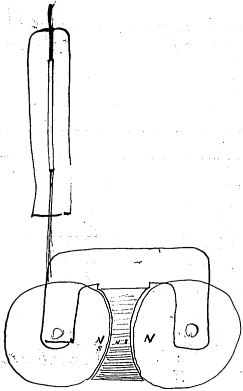


Jany 31 1878
TAE

4/16


Camphor
Carbn
Carbn

Carburet of Silicon
For Incandescence-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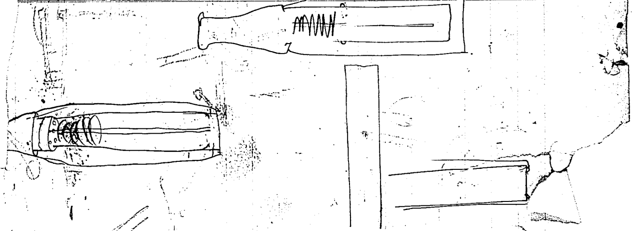
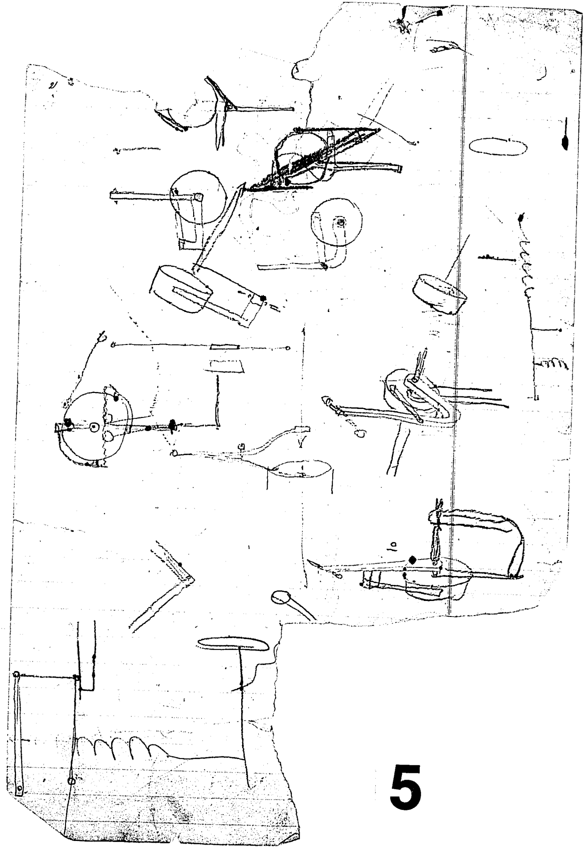
S
N S
N



May 12 1876

3/16

5/16

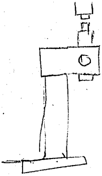


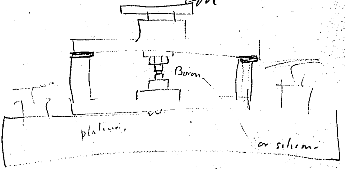
5

Electric Light — Stockton Griffin

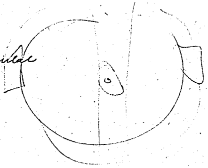
August 27, 1878

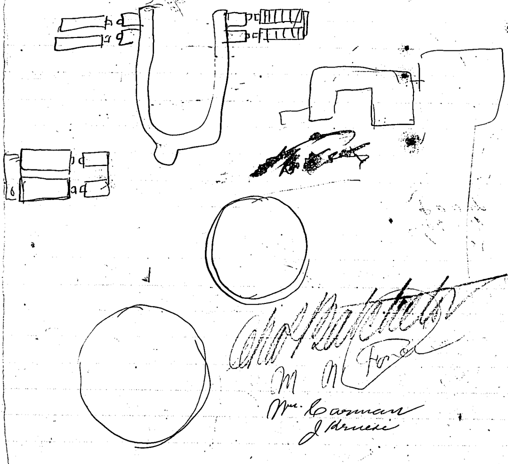
J Kruesi
T A Edison
Chas Batchelor
M N Force




Boron
platina
or silicon

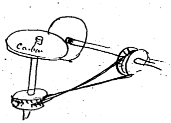
Copy of this drawn in Experimental Researches Vol 1 Page 117 on the 28th day of Sept 1878
Wm Carman

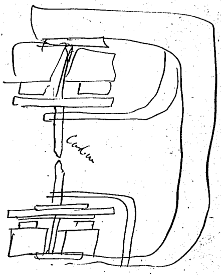


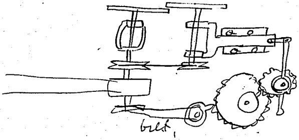


Chas Batchelor
M N Force
Wm. Carman
J Kruesi

Sept 8 1878
Carbon Electric Lamp
T A Edison







91

91

Sept 9 1878

T A Edison

Stockton L Griffin

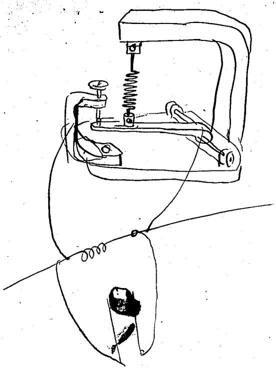
Chas Batchelor

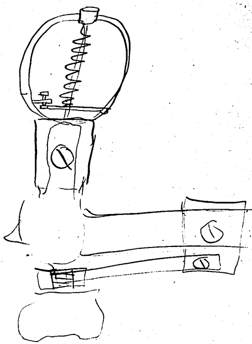
J Kruesi

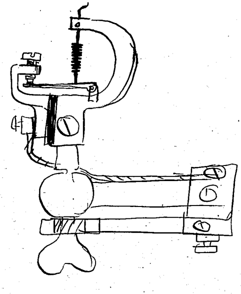
Electric Light

G E Carman

M. N. Force







contd on page 179 Vol 1. Elec Lam

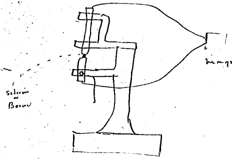
Oct 7. 1878 - Wm Carman

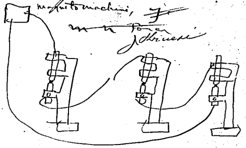
9

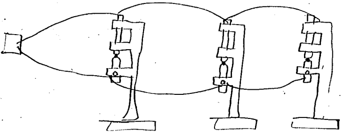
(Copied in book No 1 page 114 Sept 28. 1878
Wm Carman)

Electric Light

Sept 9 1877
T A Edison
Chas Batchelor
James Adams
~~J~~
~~M N Force~~
J Kruesi


magneto machine
Silicon or Boron


magneto machine,



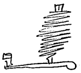
The Employment of Silicon or Boron = (Metallic) serves to ensure the Continuity by their Conductivity and still have resistance enough to allow the arc to form — Besides the presence of Silicon Keeps the Carbon points at a proper distance by its presence between them

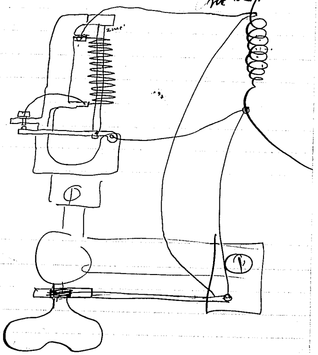
6 T. A. EDISON. Electric Light 6

Menlo Park, N. J., Sept 10th 1878

= Chas Batchelor

Mn N Force





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Page 118 on Sept 28. 1878

Stockton L Griffin

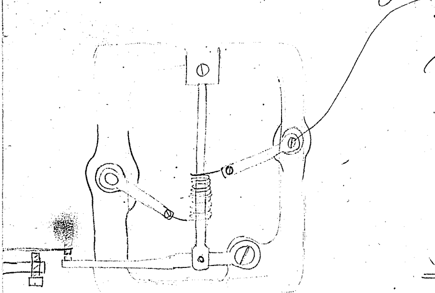
W Carman

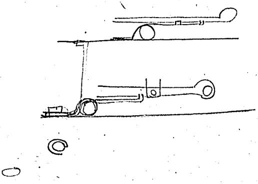
10

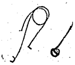
9 Electric Light Subdivision

Sept 11 187

Stockton L Griffin
Chas Batchelor
J Kruesi
Thos Logan
T A Edison
M N Force







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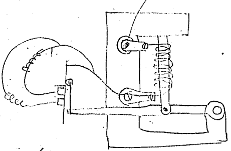
Eng'g Researches - this 30 day of Sept 1878
Wm Carman

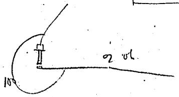
8 lectric Light
Subdivision

Sept 11 1878 8

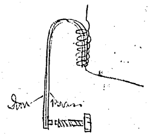
Stockton L Griffin
Chas Batchelor
J Kruesi
T A Edison
M N Force

To prevent flickering put in resistance so by little wheel on end of lever





thin strips of Brass and iron together & bent up in a U shape these are very sensitive &



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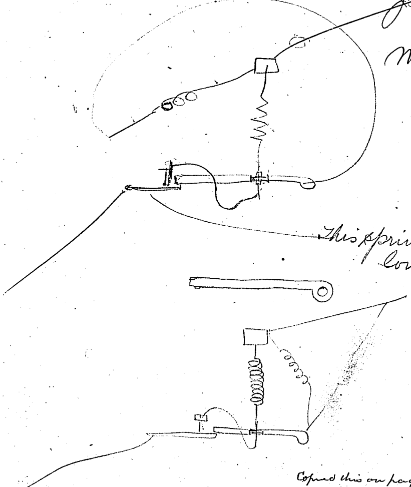
Electric Light
Subdivision

Sept 12th 1878 11

Stockton L Griffin
Chas Batchelor
J Kruesi
J A Eden
M N Force

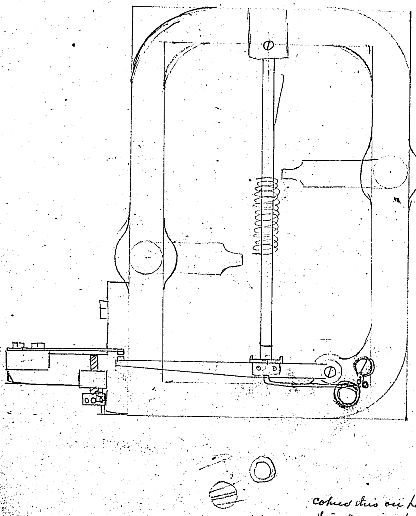


This spring very light & long.

Copied this on page 122. Vol 1. Exp Researches
this 30th day of September 1878
Wm Carman

Electric Light 10
Subdivision

Sept 12th 78
~~Stockton L Griffin~~ 78
Chas Batchelor
J Kruesi
Thos Logan
T A Edison
M N Force



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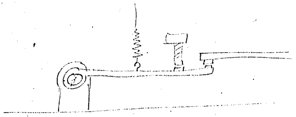
this 30 day of Sept 1878
Wm Carman

Electric Light
Subdivision

13

Sept 14th 1878 13
S L Griffin
T A Edison
Chas Batchelor
M N Force
J Kruesi



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this 30 day Sept 1878
Wm Carman

Stockton L Griffin

magneto machine

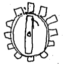
Sept 14 1878

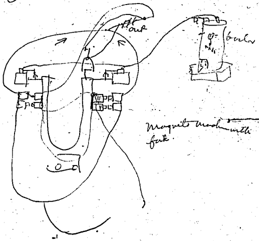
T A Edison

Chas Batchelor

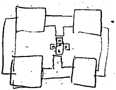
Martin N Force

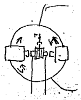
J Kruesi

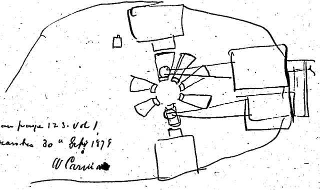




magneto mach with fork.







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of Elec Researches 30th Sept 1878
W Carman

Electric Light

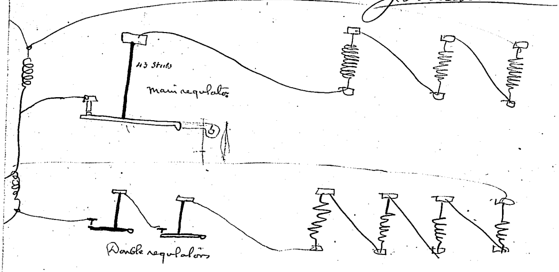
Stockton L Griffin

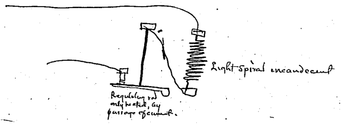
Sept 14 1878 T A Edison

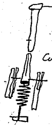
Chas Batchelor

M N Force

J Kruesi


43 Stubs
Main regulator
Double regulators


Light spiral incandescent
Regulating rod only heated, by passage of current.



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this 30th day octr 1878

16 16

Stockton L Griffin

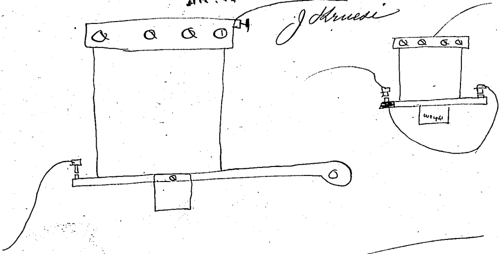
Electric Light

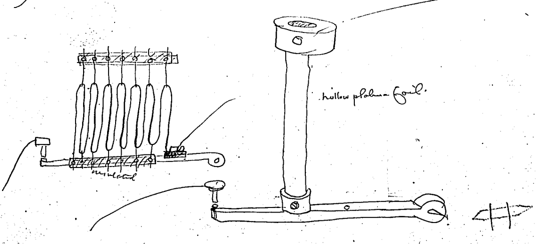
Sept 14 1878 T A Edison

~~Chas Batchelor~~

M. N. Force

J Kruesi




hollow platina foil.
insulated

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This 30th Sept 1878
W Cameron

Electric Light Subdivision

Sept 15 1878

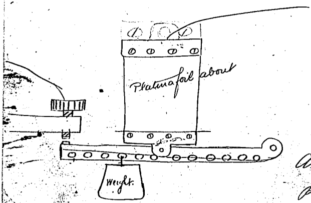
17

17

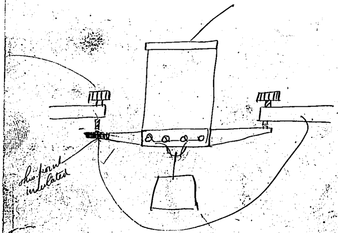
Stockton L Griffin
~~Chas Batchelor~~
J Kruesi
T A Edison
M N Force

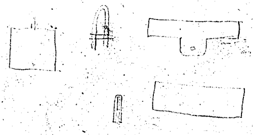
Kruesi

Make "light" instrument like this:—


Platina foil about
Weight

and another with double points


this point insulated



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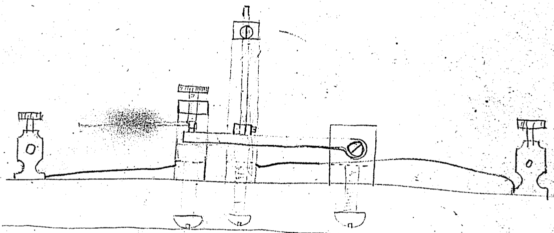
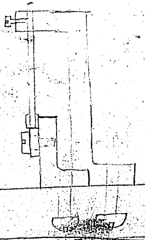
this 30 day Sept. 1878
W Carman

18

Electric Light — Sept 16th. 1878 18

Stockton L Griffin
Kruesi
T A Edison
Chas Batchelor
M N Force
J Kruesi





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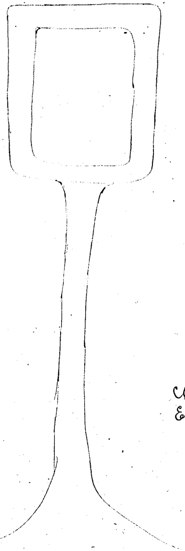
Vol 1. Page 127. Sept 30/78
W Carman

21

21

Electric Light

Oct 14 78
T A Edison
Stockton L Griffin
Chas Batchelor
M N Force
J Kruesi



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Exp Researches Oct 1, 1878
W Carman

Electric Light

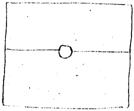
20 Subdivision

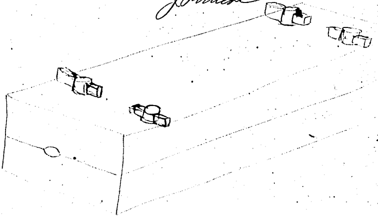
Sept 17th 1878 20

Stockton L Griffin
T A Edison
Chas Batchelor
M N Force

Mould for compositions for increasing the heat in spiral in a glass tube

J Kruesi





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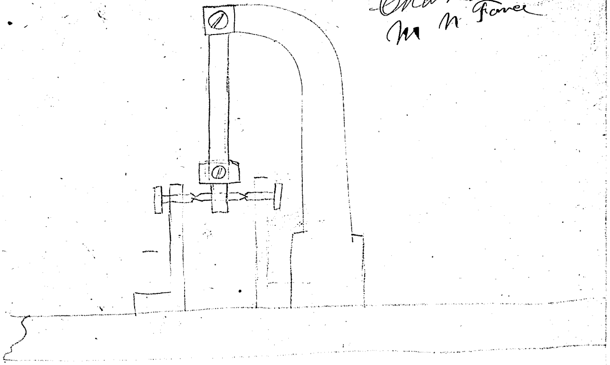
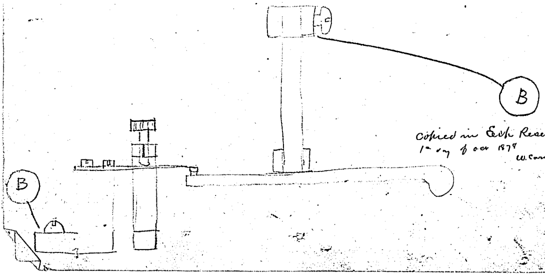
Ele Researches first day of Oct 1878

W Carman

Electric Light — Sept 13th 1878

Stockton L Griffin
J Kruesi
T A Edison
Chas Batchelor
M N Force





Vol 1. P 128
Copied in Ech Researches, this 1st day of Oct 1878
W. Carman

T. A. EDISON.

102

Menlo Park, N. J., Electric Light 187

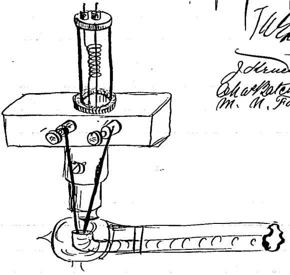
Sept 17 1878

T A Edison

J Kruesi

Chas Batchelor

M. N. Force



Personally appeared before me this
13 , the said Thos. A. E
Chas. Batchelor, John Kreuzi, and Martin Force,
and acknowledged the above to be their signature

Notary Public.

Copied on P 188 Vol 1 Exp Researches

Oct 12. 1878

Wm Carman

T. A. EDISON.

103

Menlo Park, N. J., 187

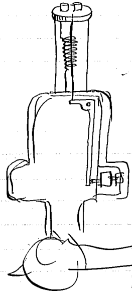
Sept 17, 1878

T A Edison

J Kruesi

Chas Batchelor

M. N. Force



Personally appeared before me this day
18 , the said Thos. A. Edison
Chas. Batchelor, John Kreuzi, and Martin Force
and acknowledged the above to be their signature

Notary Public.

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Oct 12, 1878

Wm Carman

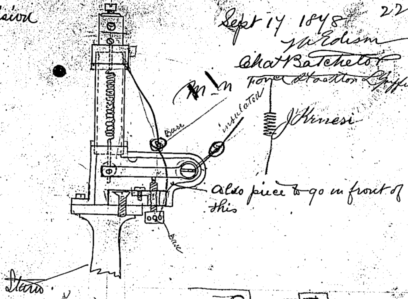
Electric Light Subdivision

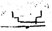
Lamp & Stand

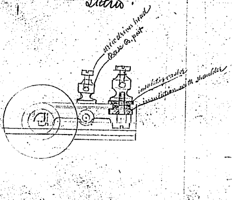
Sept 17 1878

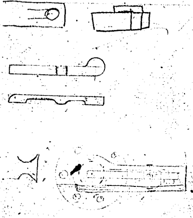
T A Edison
Chas Batchelor
Force Stockton L Griffin
J Kruesi

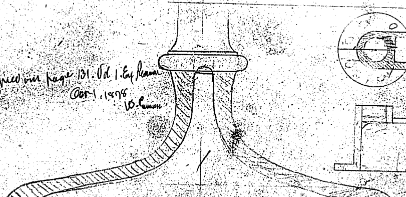
~~M~~ N


Base
insulated
also piece to go in front of this
Base
Stand




screwdriver head
Base B. post
insulating washer
insulation with shoulder





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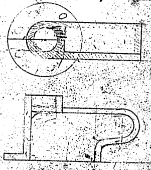
Oct 1. 1878
W. Carman



Electric Light Sept 12th 1878

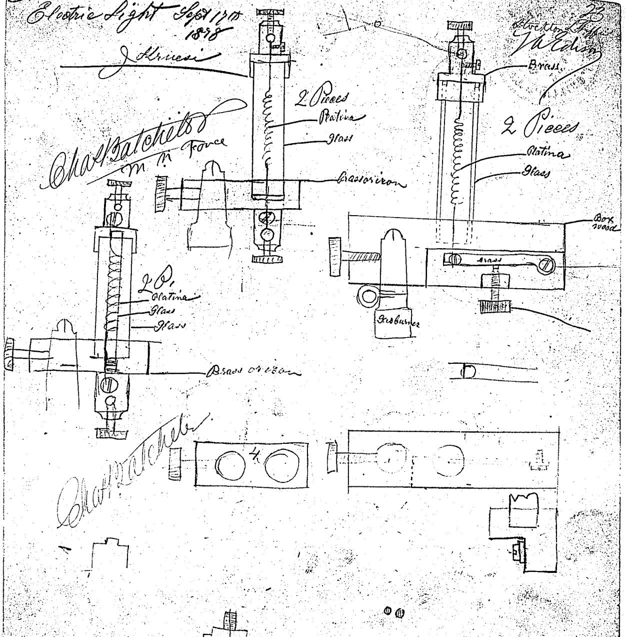
J Kruesi

Electric Light

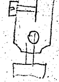
T A Edison

Chas Batchelor

M N Force


2 Pieces
Platina
Glass
Brass or iron
Brass
2 Pieces
Platina
Glass
Box wood
Brass
Gas burner
2 P.
Platina
Glass
Glass
Brass or iron
4

Chas Batchelor



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W Carman

6

Electric Light

Sept 17th

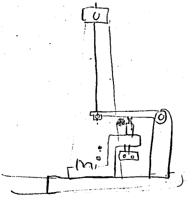
T A Edison

Chas Batchelor

M. N. Force

J Kruesi

Stockton L Griffin



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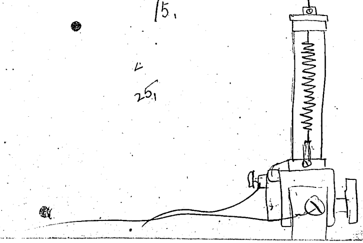

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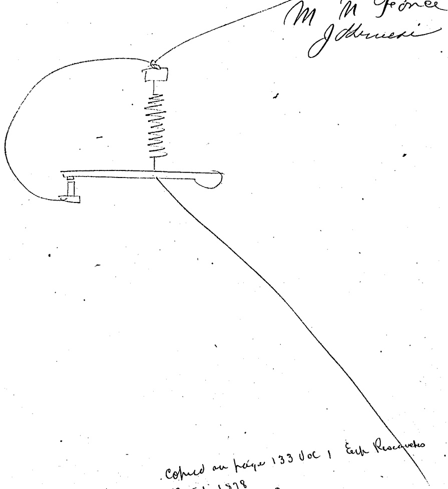
Oct 1, 1878 W. Carman

Apl 14 1876
T A Edison
Stockton L Griffin
Chas Batchelor
M N Force
J Kruesi



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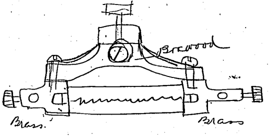
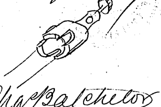
Dec 1. 1878 W Carman

Electric Light — Sept 18th 1878

Stockton L Griffin
J Kruesi
TA Edison





Chas Batchelor
M N Force

Kruesi Make one this way with air holes in the end

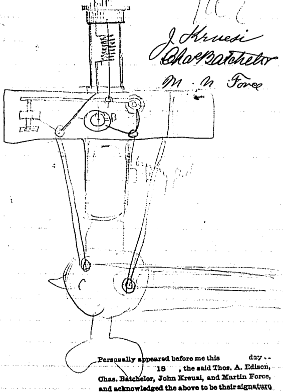
Copied this on page 134 Vol 1 Exp Researches
Oct 1, 1878. C Carman

T. A. EDISON.

Electric Light 1D 4

Menlo Park, N. J., ________________ 187

Copied in page 179 Vol 1 Exp Research
Oct 17. 1878



J Kruesi
Chas Batchelor
M. N. Force

Personally appeared before me this   day
18   , the said Thos. A. Edison,
Chas. Batchelor, John Kreuzi, and Martin Force,
and acknowledged the above to be their signature

Notary Public.

Electric Light

40 lb per foot = 211.200 lb per mile

5280
40
211200

46 lb per foot 243.480

Sept 20th ~~1878~~

Stockton L Griffin

T A Edison

Chas Batchelor

0.00489 M n Force

J Kruesi

40173/400
6087/40
243480

243.480 / 11.920000 / .00489
97 3920
2185800
19 47840
2344600
2191320

.00489
243480
0393320
001956
001467
001956
00978
119051920

.00489 ohms
243480
20

1192.45
.00489
1073205
953960
476780
5.8290805

.00489 ohms
2
.00978

12000 feet ~~copper~~ Copper 40 lb per foot =
.00978 ohms.

.00978

8 5/8.

1.00000

= 60.8%
12.00%

Copied on page 123 Vol 1 Exp Researches
Oct 2. 1878 DC

Electric Light Subdivision

Stockton L Griffin

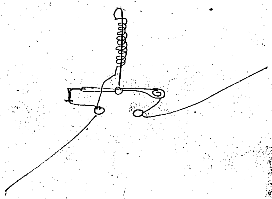
Sept 21st 1878

Chas Batchelor

J Kruesi

T A Edison

M N Force



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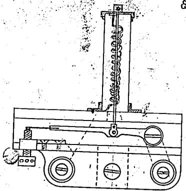
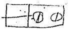
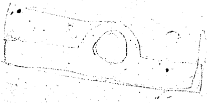
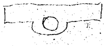
Exp Researches Oct 1. 1878

JW Carman



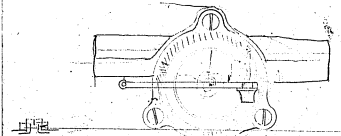


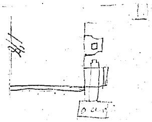


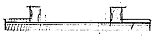


30 Electric Light Sept 23d 18

J Kruesi
Stockton L Griffin
T A Edison 30
Chas Batchelor
M N Force







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Sept 1, 1878
W Carman

Electric Light Division

32

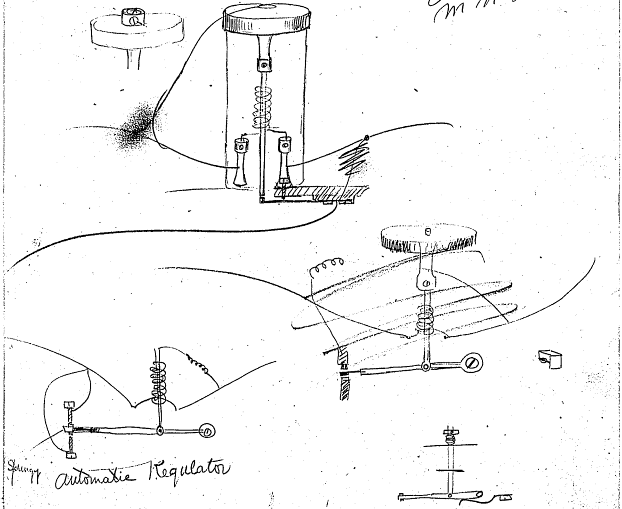
Sept 24 1878 32

T A Edison

Chas Batchelor

J Kruesi

M N Force



Automatic Regulator

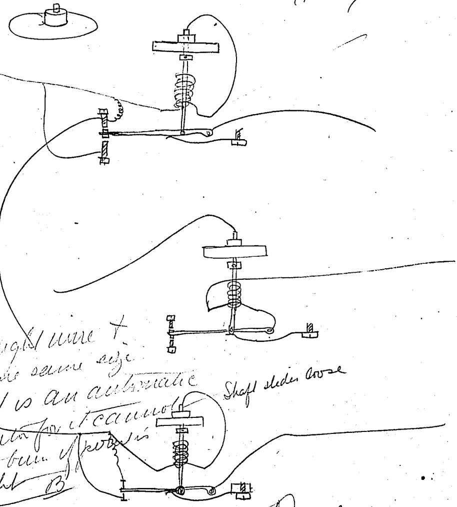
Copied on page 136 Vol 1 Ext Research
Nov 1. 1878 N Carman

35

Edison's Electric Light
33 Subdivision

Sept 24th 1878
Stockton L Griffin
Chas Batchelor
J Kruesi
T A Edison
M N Force

33



When upright wire & spiral are same size then it is an automatic Regulator for it cannot heat to burn if points is set right B

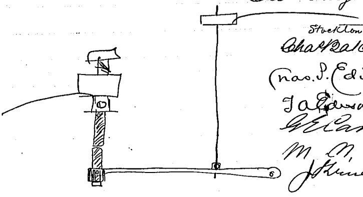
Shaft slides loose

Automatic Regulator

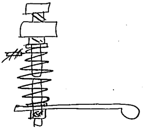
copied on page 137 Vol 1 Oct 1. 1878
W Carman

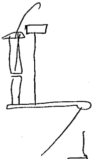
Electric Light Expr. 25

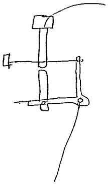
Electric Light Sept 20 1878

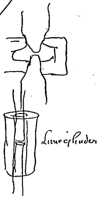


Stockton L Griffin
Chas Batchelor
Chas. P. Edison
T A Edison
G E Carman
M N Force
J Kruesi









Copied on page 181 Vol 1 Exp Researches
Oct 7. 1878 W Carman

T. A. EDISON.

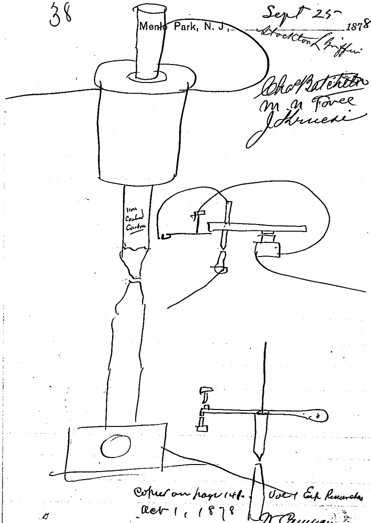
Electric Light 36

38

Menlo Park, N. J., Sept 25 1878

Stockton L Griffin

Chas Batchelor
M N Force
J Kruesi



Copied on page 141. Vol 1 Exp Researches
Oct 1, 1878
W Carman

T. A. EDISON.

37.

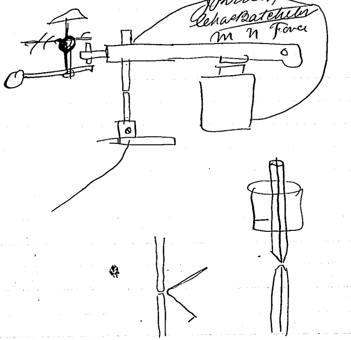
34 Electric Light

Menlo Park, N. J., 187

Stockton L Griffin

Sept 25 1878 T A Edison
Wm Carman

T A Edison
J Kruesi
Chas Batchelor
M N Force



Copied on page 140 Vol 1. Exp Researches
* Oct 1, 1878
Wm Carman

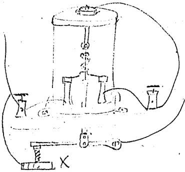
Electric Light division

Sept 25 1878 36

T A Edison
~~Stockton L Griffin~~
Chas Batchelor
G. E. Carman
M. N. Force
J Kruesi

36

We have now a perfectly regulating light



Spiral wound double to allow for expansion, and the wire in middle same wire as the spiral, only the spiral is flattened & make stronger, and allow more heating surface.

As the platina rod expands it closes the cut off points at X, and when the spiral & platina rod are the right size, this is a perfectly automatic cut off; ~~So that~~ however much current you put on it will regulate before burning up, although the contraction when cold has allowed the points to separate 1/8 inch

Copied on Page 439 Vol 1
Exp Researches [illegible] 28
W Carman

Chas Batchelor

Martin N. Force

Wm Carman

Electric Light

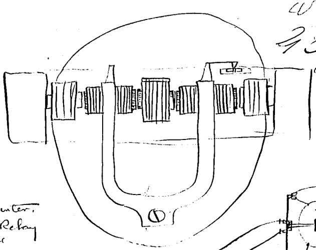
Sept 25 1878 Thos A Edison

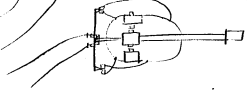
Chas Batchelor

J C Carman

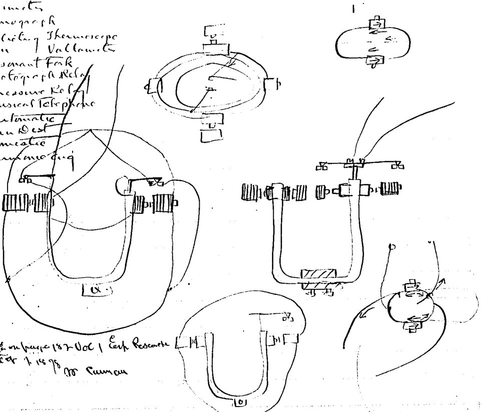
M. N. Force

J Kruesi





Stock Printer.
Pressure Relay
Megaphone
Telephone
Electric pen
Tasimeter
Phonograph
Reflecting Thermoscope
" Voltameter
Resonant Fork
Motograph Relay
Pressure Relay
Musical Telephone
Automatic
Amn Dist
Domestic
Harmonic Eng



Copied on page 182 Vol 1 Exp Research this Oct 1 1878 W Carman

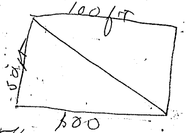
Sept 25. 1878

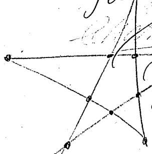
Stockton L Griffin

J A [illegible]

M N Force

J Kruesi





200
6

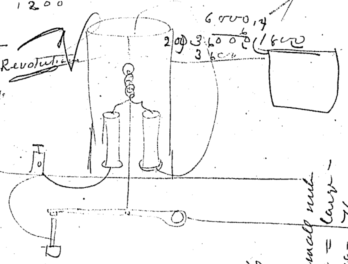
K

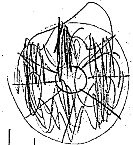
200
6
1200

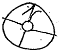
255
36
1530
765
3)9180
3060 Revolution

Diarmels

6000,14
6
2)3600(1800
36







76
18

X = small one
X + 18 = large
~~X~~ + X + 18 = 76
X = 28
18
46

~~Lumber~~ boys had 76 apples together & one had 18 more than the other how many each

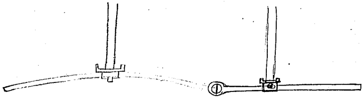
Copied on Page 139 Vol 1 Exp Researches
Oct 1-78 W Carman

~~3 Afternoon~~

29

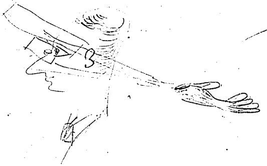
76
18
58

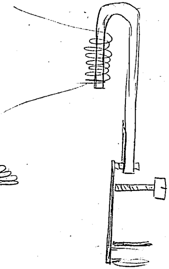
29
18
47

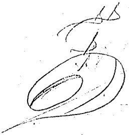


T A Edison

Previous to Sept 25 1878
Wm Carman
M N Force
J Kruesi







Copied from page 139 Vol 1 Nov 1/78
WCarman

Electric Light division Sept 26 1875 40

40

~~Stockton L Griffin~~
Thos A Edison
J Kruesi Chas Batchelor
Martin N Force

Experimented with incandescence of sticks of carbon = it will expand and cut off similar to platina & other metals but when brought up to give the same light as platina it melts very easy

I Put sticks of different thicknesses & lengths of of Carbon in place of platina in our light stand, result was not comparable with platina

We want Iridium or or Platinum-Iridium —
also try Ruthenium —

Sticks of finely divided platinum —

Wm Carman

Copied on page 142 Vol 1. Exp Researches Oct Dec 1875
W C

Electric Light Subdivision

Sept 26th 1878
T A Edison
Stockton L Griffin
Chas Batchelor
Martin N. Force
Wm Carman
J Kruesi

39

Last night we placed around the light another glass tube, & cemented it at bottom, & filled the intervening space with alum & water, to prevent in a measure the radiation of heat from it. this has the desired object to a great extent but we want something that will do it better

Copied on page 141 Vol 1 Exp Restoration
Oct 1, 1878
Wm Carman

45

Electric Light Sept 27, 1878

Stockton Griffin

T A Edison

Chas Batchelor

8
8
64
22
12
4

64
22
42
12
504

50.2656 inches area
12 M N Force
603.1872 solid content in inches

.32118
504
128472
160590
161.87472

.32118
603
96354
192708
193.67154

128

48.433
4
193.732

5280 | 113.400 | 21½
105 60
7 800
5 280
2 520

2 $\frac{13}{16}$

2 113.400

21½
9
189

45
45
90

6 13

copied on page 144 Vol 1 Elec Research
Oct 24 1878
NC

45

Electric Light Subdivision Sept 27 1878

Stockton L Griffin
Chas Batchelor
Martin N. Force
J Kruesi

Made cylinder of Caustic Magnesia pressed for light and it retains its heat but the loose unpressed does it much better

Struck the idea that probably coating the platina spiral with a saturated solution would be what we want.

Solution Alum very good bright & leaves good deposit on spiral

Sulphat Magnesia more brilliant light leaves little deposit.

Copied this on page 146. Vol 1
Exp Researches Dec 2. 1878
Wm Carman

Tungstate Soda no good.

Chlorate Potash no good

Chloride Sodium very good, small deposit

Acetate lead no good melts platina

Sulphate Thallium N Good

Carb Yttera. Fair something like Oxolate Cerium

Electric Light 27 Sept 78

Stockton L Griffin
T A Edison
Chas Batchelor
J Kruesi
Martin N. Force

Oxide Zircon. not very good, might try it quicker

Niobic acid fair - redish

Walfram not good —

Caesium Alum not quite so good as Magnesia

Osmium - N.G.

Strontium N.G.

Protochloride of Tin N.G.

Lactate Zinc - fair

Caustic Strontia N.G.

Bromide of Cadmium N.G.

Carb Lithia N.G

Oxide Glucinum acts like Magnesia

Ox. Beryllium - not good

Acetate Alumina - N.G

Copied on p. 147 Vol 1 Exp Researches Oct 7. 1898

Electric Light Subdivision Sept 27th 1878

Stockton L Griffin
Chas Batchelor
Martin N. Force
Wm Carman
J Kruesi

Length of time it takes to heat over bunsen burner to red heat the following substances:=

	Seconds	Remarks
Limes for OH light	2	
Kaolin	1½	
Tripoli	1	
Sulp. Baryta	3	
Whiting	5	
Fire clay	3	
Silicic Acid	7	
Woodbridge Clay	4	takes 7 to heat first time
Powd. Marble	5	
Pumice Stone	5½	
Platinum Black		first rate heats before Platinum
Caustic Magnesia		heats white when platina red
+ Carb. Magnesia		heats white when platina red
Caustic Magnesia		contracts less by heat than Carb. Mag.
Oxalate Cerium		Excellent Good gets red befor platina spoon

Copied this on page 145 Vol 1 Elec Researches Oct 2 1878 Wm Carman

41

T. A. EDISON

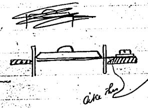
41

Menlo Park, N. J., Sept 27 1878

T A Edison

Kruesi

Will you fix this platina to the glass, and cut away the brass right under the tag ~~it~~ and make ~~the tag~~ on it narrower so as to make the platina have no pull on it whatever



Batchelor

J. Kruesi

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W. Carman

Stockton L Griffin

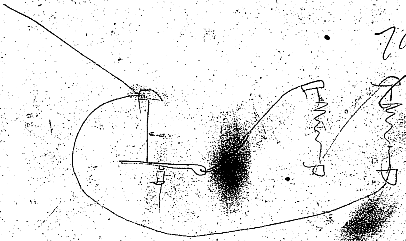
M N Force

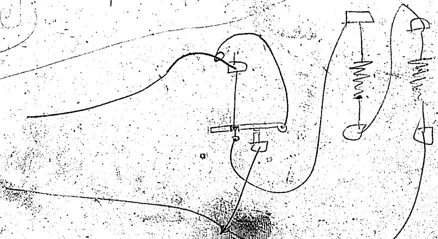
50

72 Sept 1878 42

Electric Light
Sept 27. 1878
Stockton L Griffin

T A Edison
J Kruesi
Chas Batchelor
M N Force





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Oct 7. 1878
McCarthy

98

Sept 27 1878

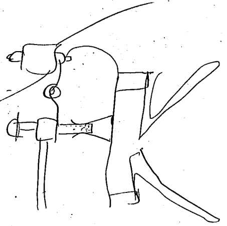
T A Edison

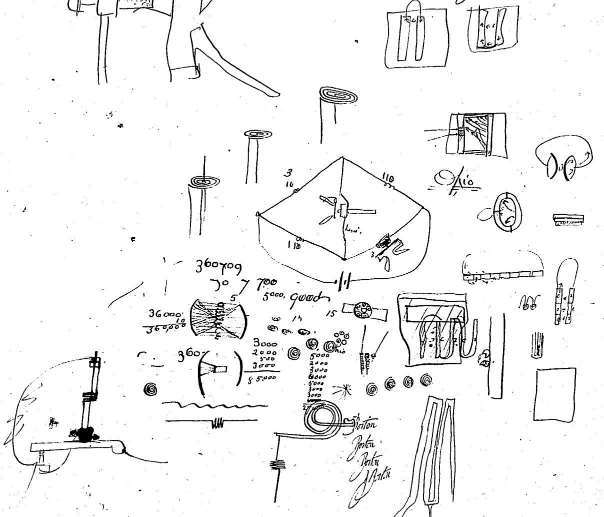
Chas Batchelor

W E Carman

M. N. Force

J Kruesi





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110
Lu'i,
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360709
70 7 700
5
5000. good
36000
10
360,000
14
15
360
3000
2000
500
3000
85,000
Ohio
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6000
5000
3000
3000
Boston
Boston
Boston
J Boston

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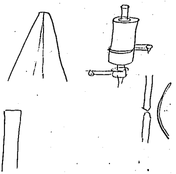
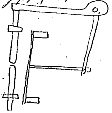
Oct 7. 1878
W Carman

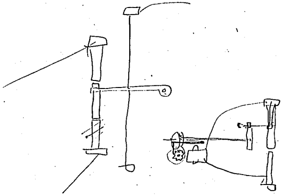
Electric Light September 27 1878

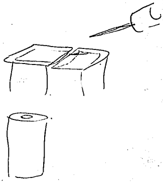
Thomas A Edison
Chas Batchelor
Wc J Kruesi
G Carman
M. N. Force

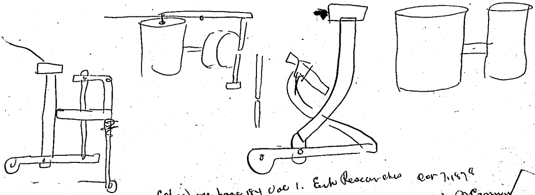
Stockton Griffin











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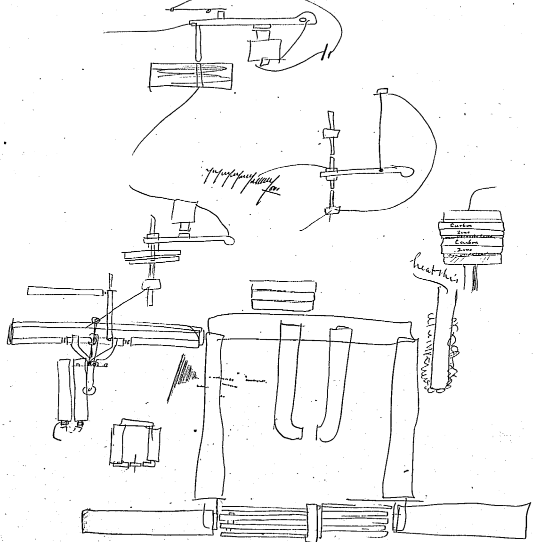
Electric Light September 1878 27

T A Edison
Chas Batchelor J Kruesi
G E Carman
M N Force

Stockton L Griffin


Carbon
Zinc
Carbon
Zinc
heat this

Copied on page 185 Vol 1 Exp Researchs
Oct 7. 1878 M Carman

Sept 27 1878
TAE
Make a lampwick of pressed platinum black and asbestos on outside, also try a spiral

---

Electric Light, try Palladium

Chas Batchelor
Chas. P. Edison
TA Edison
GE Carman
J Kruesi
M N Force
Stockton L Griffin

Copied on page 187 Vol 1 Exp Researches
this 7th day Oct 1878
W Carman

Electric light —

September 27. 1878

T A Edison
Stockton L Griffin
Chas Batchelor
W C Carman
M N Force
J Kruesi

Make alloys of Silicon with Aluminum Zinc & platinum for incandescence, I think that a little aluminum or platinum will get rid of the brittleness,

Between the two cells which I have around the incandescent spiral put finely divided ~~alum~~ ammonia-alum. this will melt & the water will Evaporate. This will keep ~~out~~ heat from radiating;

Try Chromium/between platina points;

Make some Sulphide Silver by ~~fusing~~ melting (Hydrosulphuric Acid Chl Aq) Sulphide Silver - its malable & soft may make a plug for telephone —

Try powdered Antimony & Bismuth (easily powdered) for telephone Button —

also amorphous antimony (to make. X. p 408—9. Big Bloxam

note Coat thin ferroplate with 1/16 inch of melted resin - Damar, Shellac Etc to Crackle — make a hard rolled tin diaphragm

Try Tungsten = Electrical to make. (Big Blox. p421.

Molybdenum — — (")

copied on page 186. Vol 1. Exp Record
Oct 7. 1878 W Carman

1

Electric Light Expmts Sept 28 1878 49
(Continued)

Stockton L Griffin
Chas Batchelor
[illegible]
Martin N Force
Wm Carman

Antimonic Acid. Keeps its heat twice as long as platina spiral, and both same color. (red). —

Benzoic acid Burns up - makes good lamp black.

Silicic Acid N.G.

Asbestos = Incandescent. - **Good**

wind platina wire with it.

Bronze powder takes long time get heat & stays red hot a very long time.

Nitrate Silver very dull red But keeps it long time

Canton's phosphorus takes a very long time to heat up and takes several seconds to cease luminosity after taken from flame,

Same with Grotthus Phos —

Wachs. Phos - same & quicker —

[illegible]onesium - not so good.

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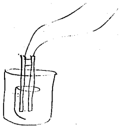
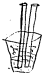
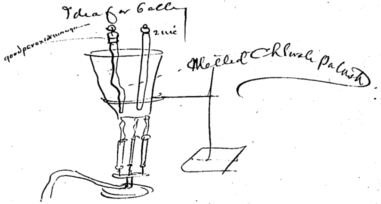
Oct 2. 1878

Sept 28 1878
TAE
Stockton L Griffin
Chas Batchelor
W C
G E Carman
M N Force
J Kruesi






Idea for Batty
good peroxide manganese
zinc
Melted Chlorate Potash

EP

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Oct. 7, 1878
W Carman

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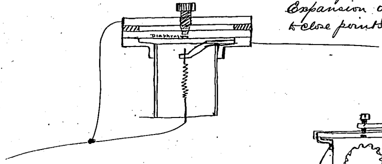
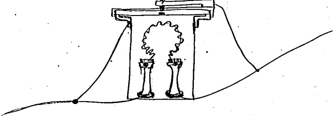
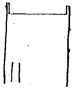
Electric Light
Subdivision.

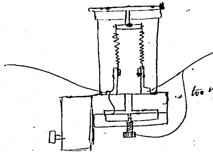
Sept 30th 1878. 53
T A E Stockton L Griffin
Chas Batchelor
M N Force
J Kruesi

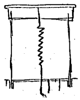
Edison's plan of cutting off by Expansion of air working a diaphragm to close points.








too much insulation



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Oct 7. 1878
MP

54

Electric Light

Sept 30th 1878 54

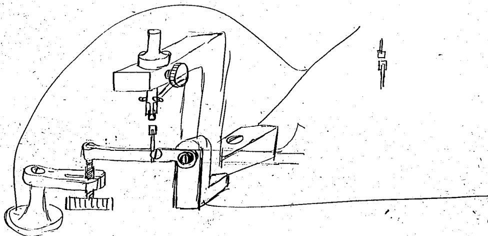
Joe

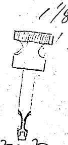
Stockton L Griffin

Chas Batchelor

Jno Kruesi

Make instrument for testing different





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Ect Records Oct 2. 1878

Electric light

Sept 20 1878
TAE
Stockton L Griffin
Chas Batchelor
M. N. Force
J Kruesi

Cerium —

Chromium =

Boron = from Borax in arc of carbon light
good conductor — metallic fracture =
brittle — forms a bent cake —
=

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Oct 2. 1878
W Carman

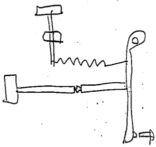
51

57

Electric Light

Sept 30th 1878
TAE Stockton Griffin
Chas Batchelor
M N Force
J Kruesi

Chromic acid burnt in flame
Residue is not a conductor of Electricity



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Oct 2. 1898
W Carman

Electric Light

Sept 31 1878
Stockton L Griffin
T A Edison
Chas Batchelor
M N Force
J Kruesi

Effect when held in flame
by platina wire of -

Chromium { When held in light gets red but not quite so much as platina it however keeps its redness 3 times as long as the platina.
When held in powder small spiral heated by 4 cells carbon no good

Oxalate of Cerium

Burnt

{ I find that when I put small pieces of this on the edge of the bunsen burner they stay there and give off a very brilliant light, and I see no diminishing of intensity in two hours. I had been watching it
I find however it gets some of its brilliancy by being supplied with oxygen as if I shut off the air in the bottom holes in burner the flame is brighter but the cerium goes out almost entirely.

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Exp Researches Oct 7. 1878
W Carman

Chromium: { With 40 cells battery a small piece of Chromium gives a light similar to Silicon (soft)

Chromic Acid

In flame = burns with very bright light, and residue swells out and keeps hot but not longer than platina however
In fact it gets hot & loses its heat both quicker than P

Edison's Electric Light

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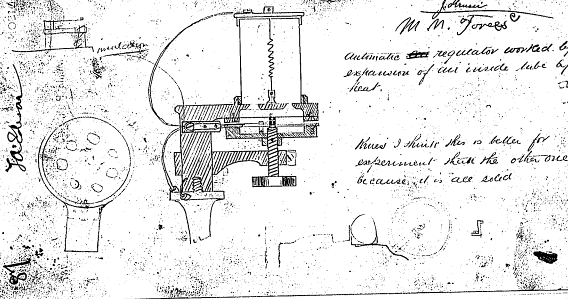
Sept 30 1878

Streltow & Griffin Dec 5, 1879 N. Curman

Chas Batchelor

J. Kruesi

M. N. Force



Automatic ~~air~~ regulator worked by expansion of air inside tube by heat.

Kruesi I think this is better for experiment than the other one because it is all solid

---

T. A. EDISON. Electric Light

Menlo Park, N. J., Sept 30 1878

Kruesi

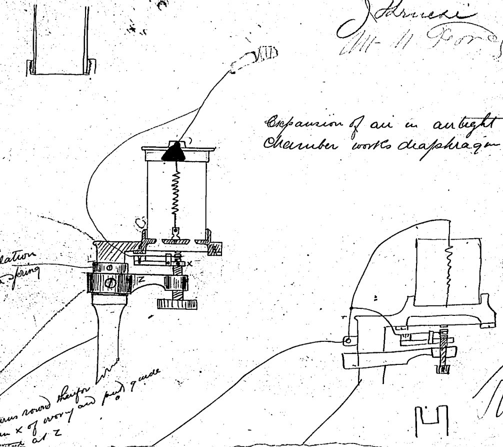
Have 2 of the new lights ready if possible & put them also also the two we have on stands

Batchelor

Use no 14 wire for connections from top of light and flatten at the end where screw goes through
Make the Copper connecting piece thicker

Electric Light Subdivision   Oct 1st 1878

W Carman
Chas Batchelor
J Kruesi
M N Force

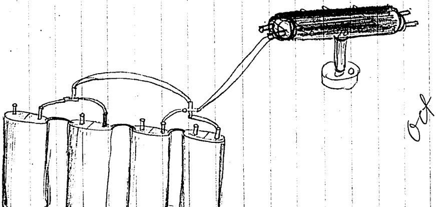


Expansion of air in airtight Chamber works diaphragm

No Insulation
Insulate the spring

Spring turns round therefor
arm x of ivory and put guide
at Z

TAE



Oct 1 1878
TAE

T. A. EDISON.

5-6

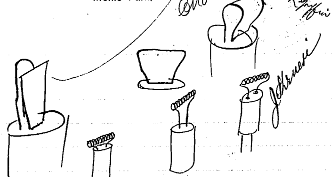
56

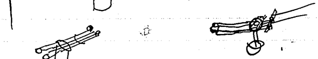
Menlo Park, N. J., 187

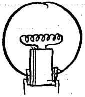
Chas Batchelor

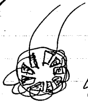
Stockton L Griffin

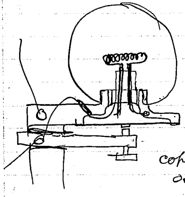
J Kruesi











Electric Light

Oct 1 1878

TA Edison

Chas Batchelor

M N Force

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Oct 3. 1878

T. A. EDISON.

58

58

Menlo Park, N. J., Oct 1 1878

Electric Light

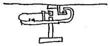
Stockton L Griffin

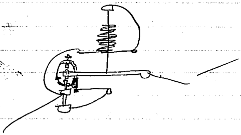
TA Edison

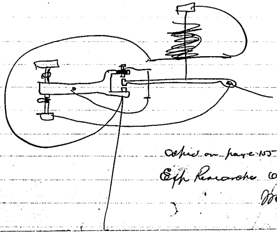
Chas Batchelor

M N Force

J Kruesi







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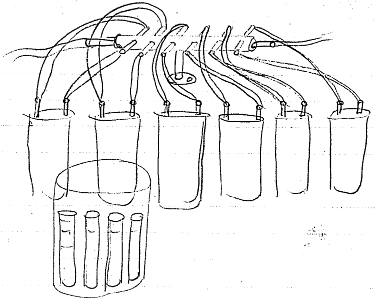
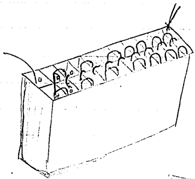
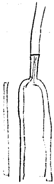
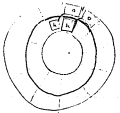
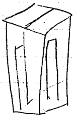


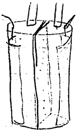




Oct 1 1878 9 pm







T. A. EDISON.

Electric Light 59

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Menlo Park, N. J., Oct 1 1878

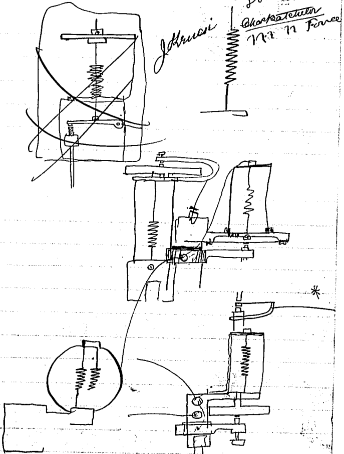
Stockton L Griffin

T A Edison

J Kruesi

Chas Batchelor

77.7 77 Force



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Oct 3d. 1878 SLG

T. A. EDISON.

60

Electric Light
Oct 1 1878.

60

Menlo Park, N. J., 187

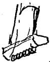
Stockton L Griffin

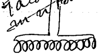
Chas Batchelor

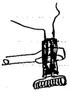
T A Edison

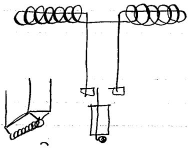
M N Force

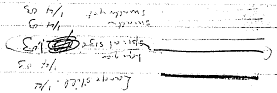
J Kruesi











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T. A. EDISON.

Electric Light

61

61

Menlo Park, N. J., Oct 1 1878

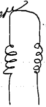
Stockton L Griffin

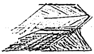
T A Edison

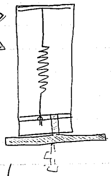
Chas Batchelor

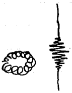
J Kruesi

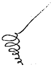
M. N. Force



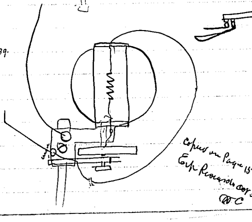








39 .37. 39.



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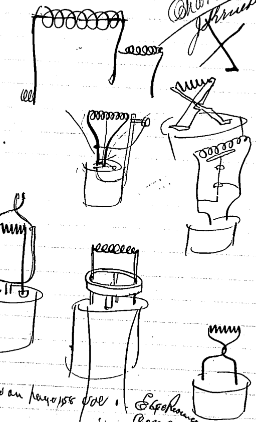
T. A. EDISON.

62 Electric Light

62

Menlo Park, N. J., Oct 1 1878

Stockton L Griffin
T A Edison
M N Force
Chas Batchelor
J Kruesi



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Dec 3. 1878
W C

T. A. EDISON. B.

63

63

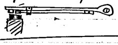
Menlo Park, N. J., Oct 1st 1878

Chas Batchelor
J Kruesi
T A E
M N Force
Stockton L Griffin

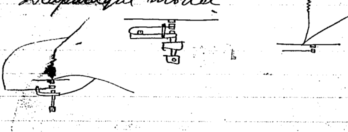
New Model

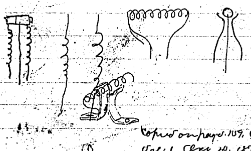
Spiral as moulded right in plaster paris

Contact point made one solid and small Spring with spark point



Diaphragm model





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Vol 1 Dec 10. 1878
W Carman

Electric Light Oct 1. 1878

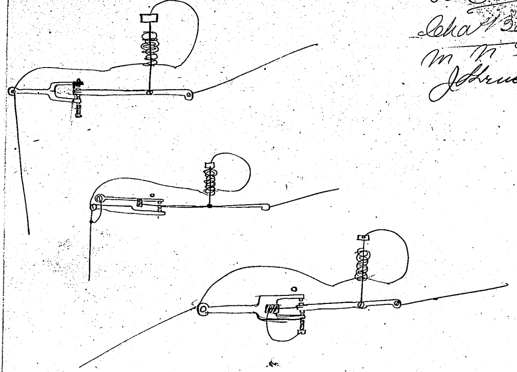
Stockton L Griffin

T A Edison

Chas Batchelor

M N Force

J Kruesi



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Oct 2. 1878
SLG

75 1 2

Electric Light - subdivision

Sept 23 1878

31

~~Stockton L Griffin~~

T A Edison

Chas Batchelor

J Kruesi

M N Force

T. A. EDISON.

#71/16 44

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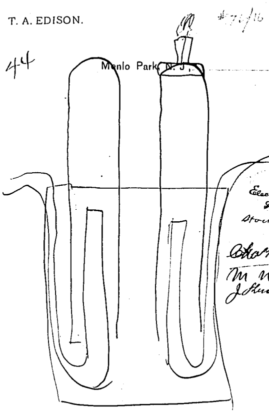
Menlo Park, N. J. 187



Electric Light
Sept 27, 1878
Stockton L Griffin

Chas Batchelor
M N Force
J Kruesi

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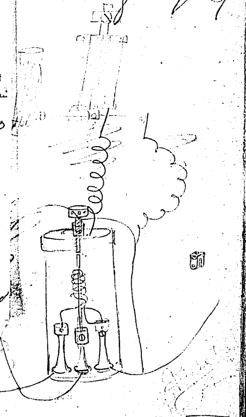
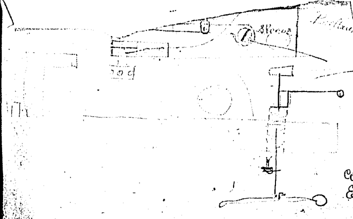
Oct 2. 1878 W Carman

th at the end

instead of bulging





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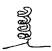
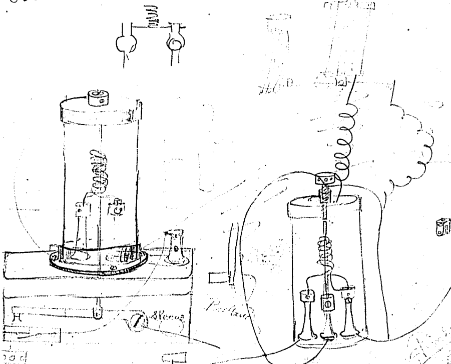
Exp Record Oct 1 1878 W Carman

91
92

Sept 23 1878
Stockton L Griffin 31
T A Edison
Chas Batchelor
J Kruesi
M N Force

 Double coil fastened both at one end expands lengthwise instead of bulging out



Copied on page 135 Vol Exp Record Oct. 1878 W Carman

T. A. EDISON.

Menlo Park, N. J., Oct 2 1878

Chas Batchelor

Mr Kruesi

I want to have 5 lamps to show:—

1 They all want to have safety spark points on lever.

2 They all want mounting on bases with bindposts

3 They all want to have No 28 Iridium wire on spirals and expansion rods.

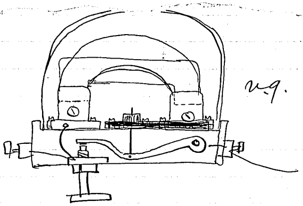
4 They all want to have 14 copper running from bindpost up to light

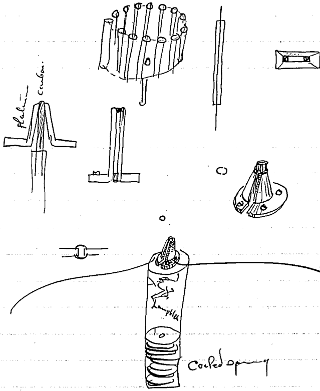
5 They all want No 28 copper wire connecting the shaft to bracket (round shaft points)

6 Two of these 5, upstairs, have platina in, they also have ~~thin~~ copper connections from bindpost to working parts. Wire must be Iridium and copper thicker

Electric Light

Oct 2 1878, T.A.Edison





T. A. EDISON.

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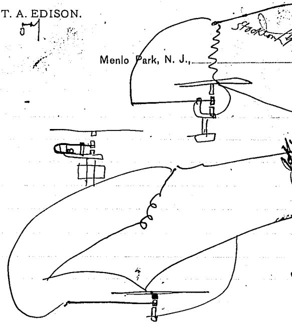
Menlo Park, N. J., ____________187

Stockton L Griffin

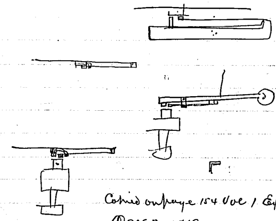


J Kruesi

Chas Batchelor

Wm M. Fowler

Electric Light
Oct 1 1878
TA Edison



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Oct 7, 1878
WC.

79

T. A. EDISON.

65

.65

Menlo Park, N. J., Oct 2 1878

Stockton L Griffin

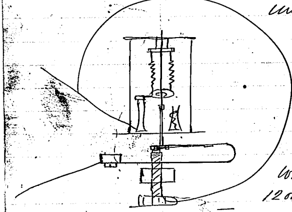
TA Edison WC

~~M n Force~~ J Kruesi

Kruesi

[illegible]

Next one must ~~have~~ spring instead of lever like ~~this~~ and 2 independent spirals of No 28 wire about 12 or 14 turns on each



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Exp. Researches Oct 4, 1878
Wm Carman

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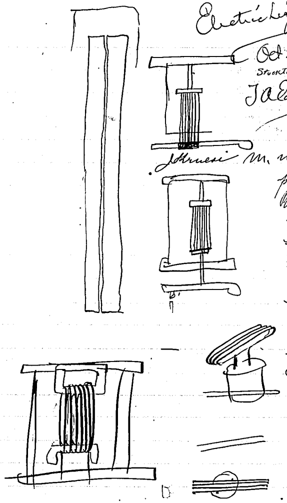
78 T. A. EDISON. 78

Menlo Park, N. J, ______187



Electric Light

Oct 2 1878

Stockton L Griffin

T A Edison

J Kruesi M. N. Force

portland

Portland

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MC

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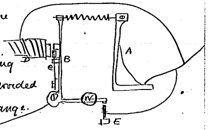
79 T. A. EDISON. 79

Menlo Park, N. J, Oct 2nd 1878

Kruesi

Make an experimental Instrument on a sounder base like this:—



A is a bracket to hold one end of spiral

B is a pivoted lever holding the other end, it is provided with a double point arrangement C.

D is regulating point. E is the safty point if the spiral busts the lever fall by weight W on to point

Make spring C very delicate and put hold back close to points.

J Kruesi

Chas Batchelor

T A Edison

Stockton L Griffin

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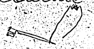
Exp Researches Oct 4 1878

W Carman
M N Force

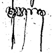
66

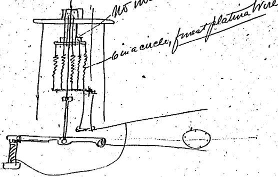
Electric Light

Oct 2nd 1878
T A Edison
Stockton L Griffin
Chas Batchelor
J Kruesi
W C
G E Carman

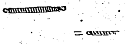


Quantity spirals

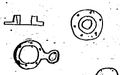


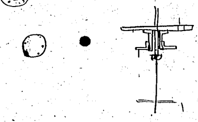


make spirals of finest platina wire with hook at each end & six holes in each plate
The spirals to be 1/4 long without the hooks
the plates to be 1" apart



Top ring
bottom ring





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Exp Researches GE Carman

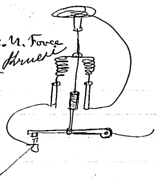
T. A. EDISON. 77

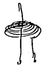
Electric Light, 77

TA Edison
Stockton L Griffin

Menlo Park, N. J., Oct 2 1878

M. N. Force
J Kruesi





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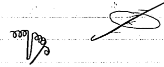
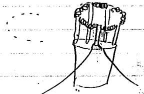
Oct 4. 1878
WC





~~1878~~

~~Ohio~~

Mississippi
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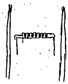
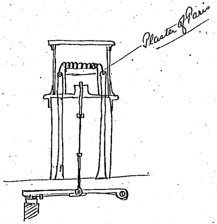
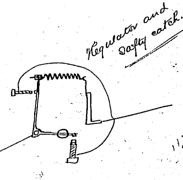
Electric Light

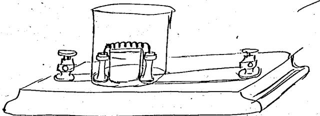
Oct 2nd 1878 67

T A Edison
Chas Batchelor
J Kruesi
G Carman
M N Force
Stockton L Griffin




Plaster of Paris


Regulator and Safety catch.



make base with 2 posts + glass over to put any thing in

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G Carman

Electric Light Oct 2nd 1878

TAE
Chas Batchelor
Stockton L Griffin
M N Force
J Kruesi

Titanium :- got by melting between Carbon points Very good light by incandescence Has to be very hot before ~~it becomes luminous~~ current will go through it. Has a very thick oxide round but with 25 cells callaud get a deflection of 1 degree on 1 coil Broke it and got a deflection 90 on 1 coil and 16 on 4 coil

Manganese :- ditto
Bad conductor, could get nothing at all through the oxide and
only 1½ degrees through the metal when broken :- on 1 coil and 25 cell callaud

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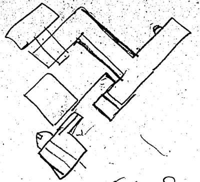
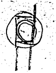
Dec 24. 1878.
W.C.





T A Edison
WC
G Carman
Stockton L Griffin
J Kruesi
M. N. Force

Oct. 3d 1878

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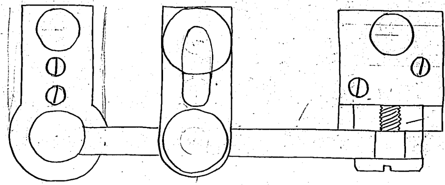
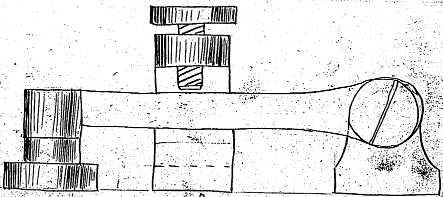
W Carman

Chas Batchelor





T. A. EDISON.

Electric Light

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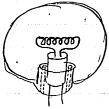
Menlo Park, N. J., Oct 3 1878

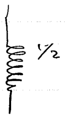
TAE

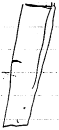
Stockton L Griffin

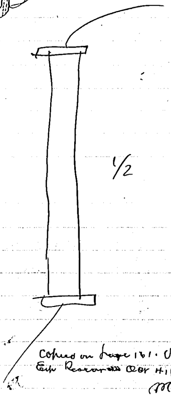


M N Force

J Kruesi







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M Carman

T. A. EDISON.

Electric Light

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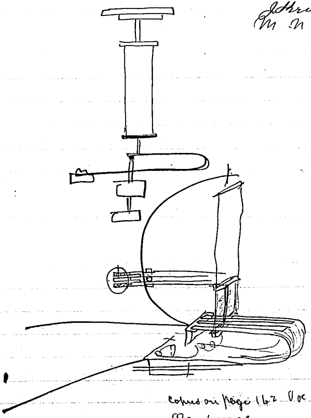
Menlo Park, N. J., Oct 3 1878

TAE

Stockton L Griffin

J Kruesi

M N Force



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T. A. EDISON.

Electric Light
Oct 3rd 78
TAE
Stockton L Griffin 70

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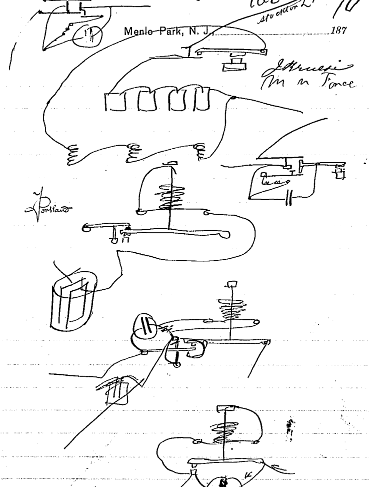
J Kruesi
M N Force



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W.C.

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Stockton L Griffin

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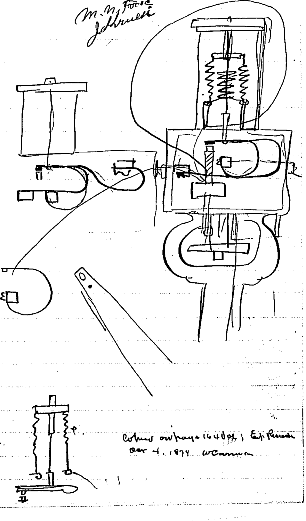
M. N. Force
J Kruesi



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Nov 4, 1878 W Carman

T. A. EDISON.

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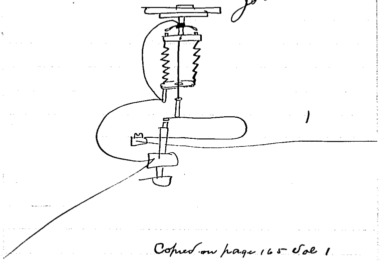
Menlo Park, N. J., Oct 3, 1878
Stockton L Griffin

Electric Light

T A Edison
M N Force
J Kruesi



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T. A. EDISON.

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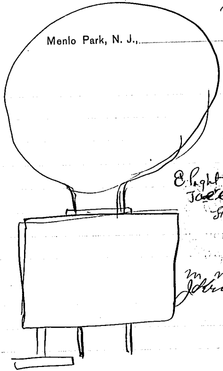
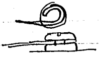
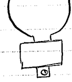
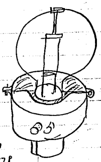


E Light
TAE Oct 3 78
Stockton L Griffin

M. N. Force
J Kruesi







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T. A. EDISON.

E Light

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94

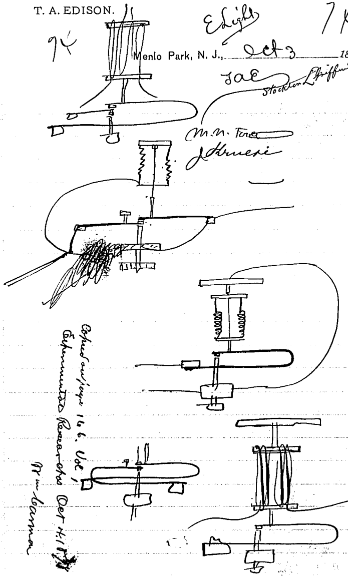
Menlo Park, N. J., Oct 3 1878

TAE

Stockton L Griffin

M.N. Force

J Kruesi



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Wm Carman

T. A. EDISON.

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Menlo Park, N. J., Oct 3d 1878

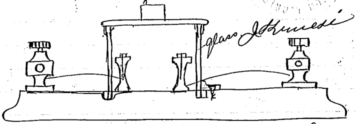
Electric Light subd. Stockton L Griffin

Tho Edison

Kruesi

Make on a sounder base

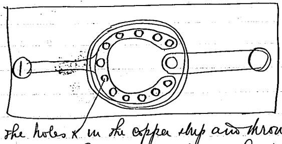
J Kruesi



make connections for the inside posts, so that I can put them any where for circular or straight spirals

Copied on page 167 Vol 1 Expl Researches Oct 4. 78

Wm Carman



The holes x in the copper strip and through the base so that I can shift the post close ~~to the~~ other one or keep further away.

J Kruesi Batchelor M N Force

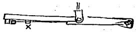
T. A. EDISON.

96

76

Menlo Park, N. J., Oct 3 1878

Jackson ;= the little holdback for this spring



at x is too far away from the points you must put it right close up to them only 1/16 away from them

J Kruesi
Batchelor
T A Edison
M N Force
Stockton L Griffin

Copied on page 168. Vol 1
Experimental this 4th day of Oct 1878
W Carman

T. A. EDISON.

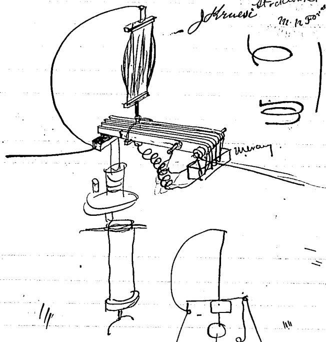
80

E Light

80

Menlo Park, N. J., Oct 3 1878

TAE
Chas Batchelor
Stockton L Griffin
J Kruesi
M N Force



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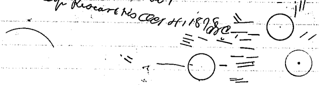
Exp Research Oct 4 1878 BC



T. A. EDISON.

87

E Light 87

Menlo Park, N. J, Oct 3 1878

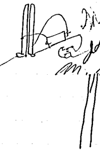
TAE

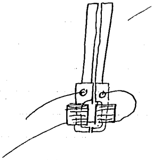
Chas Batchelor

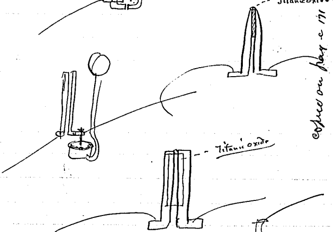
J Kruesi

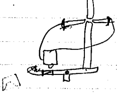
M. N. Force

copied on page 171 Vol 1 Exp Rec Dec 14 1878






Titanic oxide
Titanic oxide

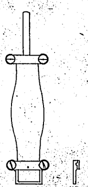


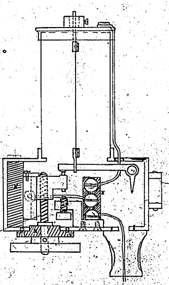
83

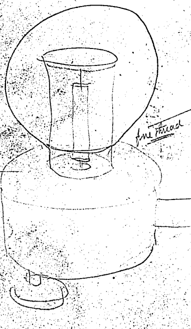
Electric Lighting
Subdivision –

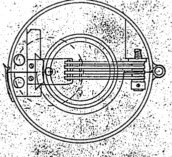
Oct 3rd 1878.
T A Edison
Chas Batchelor
J Kruesi

Instructions
xxx are vulcanized fibre ins.





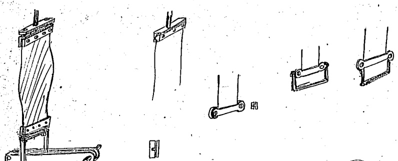


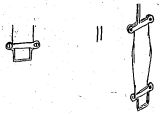


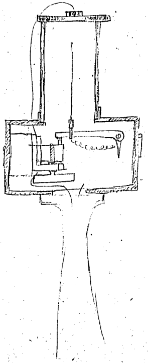
Copied in Elec Researches Vol 1 Page 172 Oct 4, 1878
Wm Carman

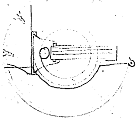
Oct 3rd 1878
TAE
Attestor S L Griffin
Chas Batchelor
J Kruesi
W C
G E Carman
M. N. Force
J Kruesi

Way of fastening the platina foil at the ends





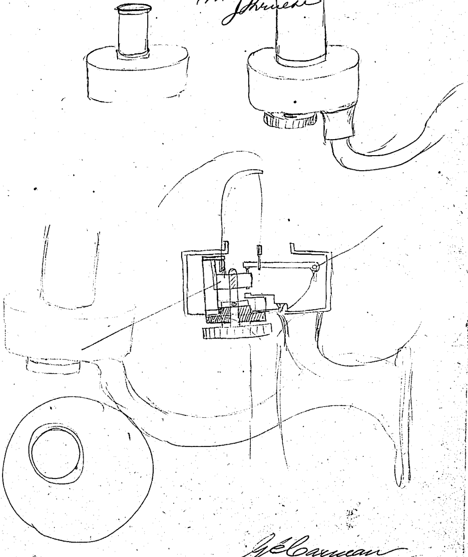




Copied on page 173 Vol 1 Exp Researches
Dec 5. 1878
W Carman

Electric Light Oct 3 1878

T A Edison Stockton L Griffin
Chas Batchelor
M N Force [illegible]
J Kruesi



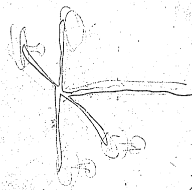
G E Carman

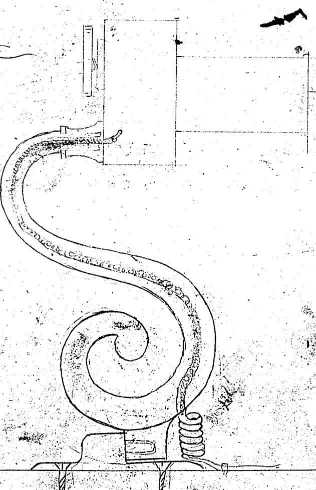
Copied on page 174 Vol [illegible] Records
Oct 5, 1878 W Carman

Electric Light
Subdivision

Oct 3 1878
T A Edison
Chas Batchelor
~~J Kruesi~~
M. N. Force

Wall bracket - 500



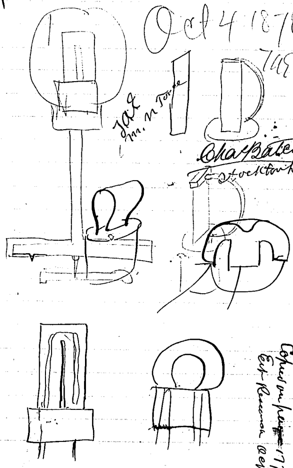


Copied on Page 175 Vol Elc Researches Dec 25. 1878.
C.J.

89

Oct 4 1878 89

TAE



TAE M. N. Force

Chas Batchelor
Stockton L Griffin

J Kruesi

Copied on page 177. Vol 1
Ex Researches Oct 5. 1878
JFC

Menlo Park, N. J., 187

104

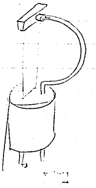
88

Electric Light 88
Oct 4, 1878.

Chas Batchelor
Stockton L Griffin

TAE

TA Edison
M. N. Force
J Kruesi



Copied on page 177 Vol 1 Ex Researches
Oct 5. 1878
JF Carman

Menlo Park, N. J., 187

T. A. EDISON.

105

T. A. EDISON. 101

Menlo Park, N. J., ____________187

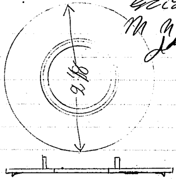
Electric Light Oct 5. 1878

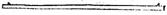
Electric Light
Oct 5, 1878

Stockton L Griffin
Chas Batchelor
Chas P Edison

Copied on page 187 Vol 1. Exp
Researches Oct 7. 1878
Wm Carman

T A Edison
G E Carman
M N Force
J Kruesi



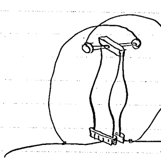


T. A. EDISON. Electric Light 105

Menlo Park, N.J., Oct 5 1878

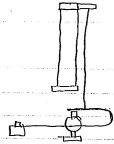
TAE

J Kruesi
Chas Batchelor
G E Carman
M N Force



Personally appeared before me this ____ day of ____ 18 ____, the said Thos. A. Edison, Chas. Batchelor, John Kreuzi, and Martin Force, and acknowledged the above to be their signature

Notary Public.



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Oct 12. 1878
W Carman

T. A. EDISON.

106

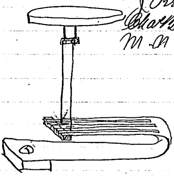
Menlo Park, N. J., Oct 7 1878

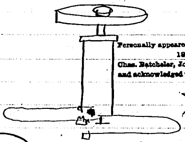
Electric Light

TAE

J Kruesi
Chas Batchelor
M N Force

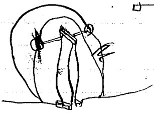
Copied on page 190 Vol 1 Oct 12 1878
W Carman

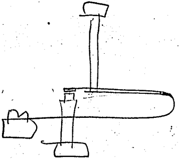




Personally appeared before me this day of, 18 , the said Thos. A. Edison, Chas. Batchelor, John Kreusi, and Martin Force, and acknowledged the above to be their signature

Notary Public.





Oct 7 1878

TAE

Chas Batchelor
M. N. Force
J Kruesi

Electric Light

107

Copied on page 190 Vol 1 Elect Researches
Oct 12 1878
W Carman

Personally appeared before me this day of, 18 , the said Thos. A. Edison, Chas. Batchelor, John Kreusi, and Martin Force, and acknowledged the above to be their signature

Notary Public.

113

Electric Light

Oct 7th 1878

Chas Batchelor

J Kruesi

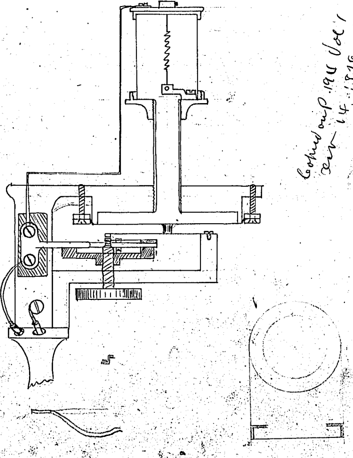
T A Edison

G E Carman

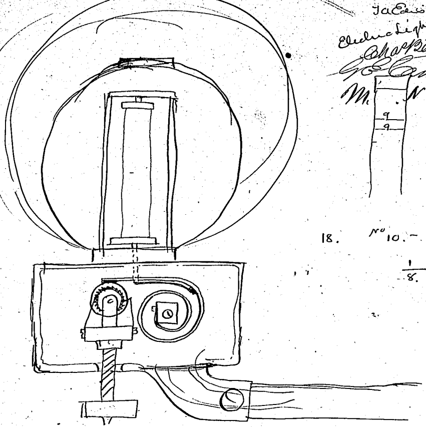
M N Force

Light regulated by expansion of a column of air heated

Copied on p 194 Vol 1 E.L. Records
Dec 14. 1878. Wm Carman



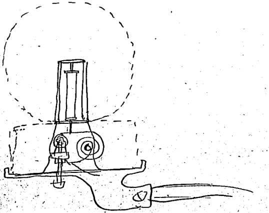
October 8 1878 116
TAEdison
Electric Light
Chas Batchelor
J.S. Carman
M. N. Force



180
9
1620

18. No 10. – 1/8 dia

1/8.

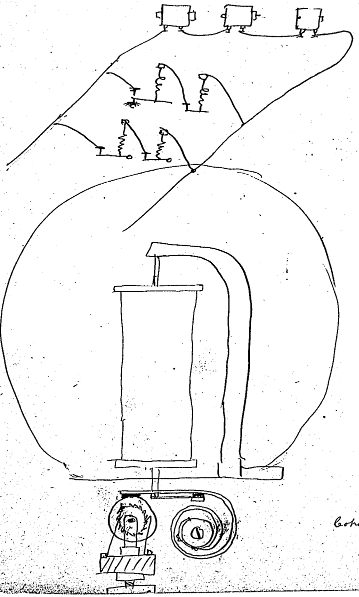


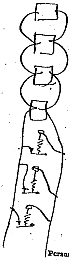
Copied on page 197 Vol 1 Exp Research Nov 14. 1878
W Carman

Electric Light

Oct 8 1878
T A Edison
Chas Batchelor
M. N. Force
Geo E Carman
J Kruesi

Three magnetos Connected for intensity





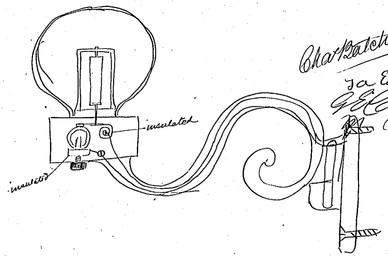
magnetos connected for intensity

Personally appeared before me this day
18 , the said Thos. A. Edison,
Chas. Batchelor, John Kreuzi, and Martin Force,
and acknowledged the above to be their signature

Notary Public.

Copied on P 204 Vol 1 Elec Researches
Oct 23. 1878
W Carman

Electric Light Oct 8, 1878


insulated
insulated

Chas Batchelor
T A Edison
G E Carman
M N Force

Copied on page 198 Vol 1 Exp Researches Oct 14, 1878
Wm Carman

Electric Light

Oct 8 1878
TAE
Chas Batchelor
Geo E Carman
M. N. Force

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Nov 14 1878
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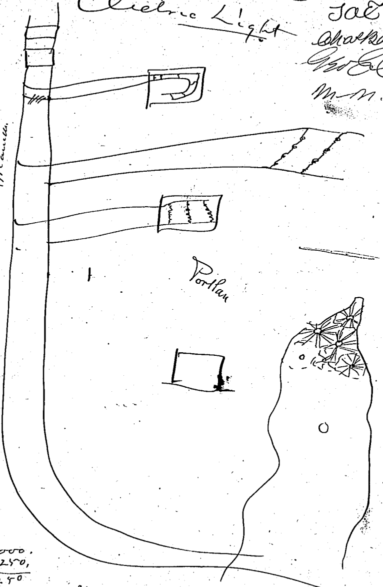


25000,

25
5

5000
25

250000.
781 250,
1031250

30.

2500
25

25

1250, 22

96

36000

7006896 8968

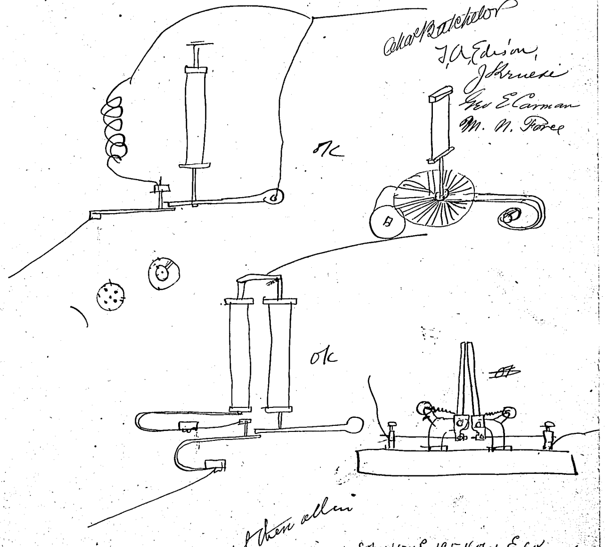
1/2

Oct 8 1878

Electric Light

Caveat No 4.

Chas Batchelor
T A Edison,
J Kruesi
Geo E Carman
M. N. Force



Got them all in

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Oct 14. 1878
W Carman

Copied on P. 192 Vol 1 Exp Researches Nov 12 78 WCarman

T. A. EDISON.

09

Menlo Park, N. J., Oct 9th 1878

Electric Light

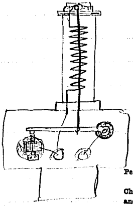
Chas Batchelor

J Kruesi

G E Carman

M N Force

T A Edison



Personally appeared before me this day of 18 , the said Thos. A. Edison, Chas. Batchelor, John Kreuzi, and Martin Force, and acknowledged the above to be their signature

Notary Public.

32

32

120

15

1232

.0157

480

12320

616

7920

.0474

12320

616

116

T. A. EDISON.

108

Menlo Park, N. J., 187

G. M. Phelps Esqr

Dear Sir

Oct 9 1878

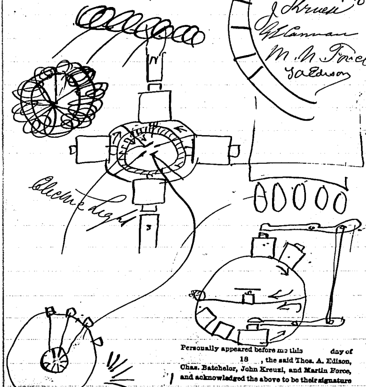
Chas Batchelor

J Kruesi

G E Carman

M N Force

T A Edison



Electric Light

Personally appeared before me this day of 18 , the said Thos. A. Edison, Chas. Batchelor, John Kreuzi, and Martin Force, and acknowledged the above to be their signature

Notary Public.

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117

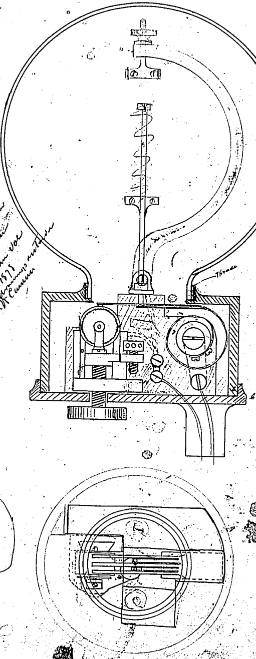
118

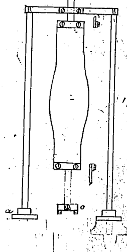
Electric Light

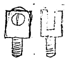
Oct 9th 1878
Chas Batchelor
J Kruesi
T A Edison
M. N. Force

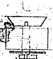
Copied on Page 199. Vol 1 Exh Record Oct 16. 1878

Lead pencil drawing on Back were copied in Vol 1 P 199 Oct 23. 1878 also 2 smaller drawings on this









a must come lower
b is fastened with cotter thus
c PLATINA Pointed

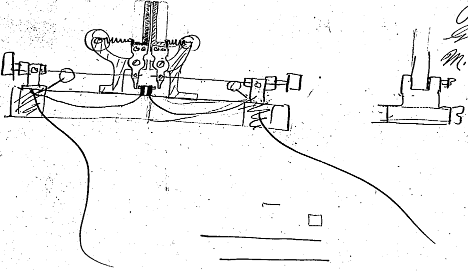
118

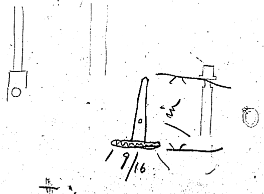
Caveat No 5

Electric Light
E L

Oct 9 1878

TAE
Chas Batchelor
Geo Jackson Ewyh
J Kruesi
Geo E Carman
M. N. Force





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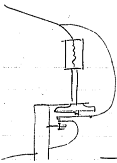
WCarman

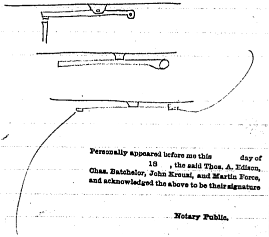
T. A. EDISON.

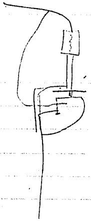
Electric Light 112

Menlo Park, N. J., Oct 9th 1878

Chas Batchelor
J Kruesi
G E Carman
Martin N Force
T A E







Personally appeared before me this day of 18 , the said Thos. A. Edison, Chas. Batchelor, John Kreusi, and Martin Force, and acknowledged the above to be their signature

Notary Public.

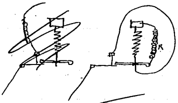
Copied on page 193. Vol 1 Elt Research
Nov 12. 1878
W Carman

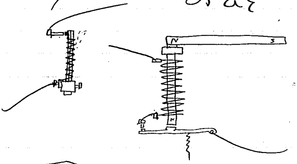
T. A. EDISON.

Electric Light

Menlo Park, N. J., Oct 9th 1878

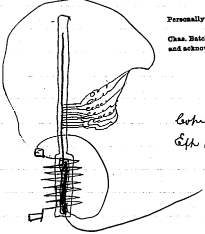
Chas Batchelor
J Kruesi
G E Carman
M N Force
T A E





Personally appeared before me this day of 18 , the said Thos. A. Edison, Chas. Batchelor, John Kreusi, and Martin Force, and acknowledged the above to be their signature

Notary Public.



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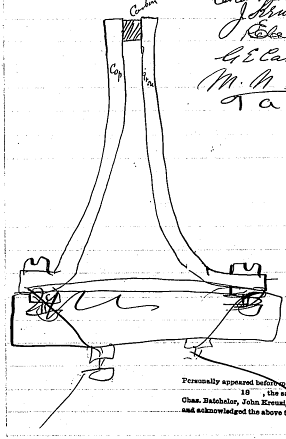
Elt Research Nov 12. 78
W Carman

T. A. EDISON.

122

Menlo Park, N. J., Oct 9th 1878

Chas Batchelor
J Kruesi
Electric Light
G E Carman
M N Force
T A E



Personally appeared before me this day of
18 , the said Thos. A. Edison,
Chas. Batchelor, John Kreuzi, and Martin Force,
and acknowledged the above to be their signature

Notary Public.

Copied on Page 202 Ex Researches
Oct 15. 1878. W Carman

122

T. A. EDISON.

111

Copied on Pag 143 Vol 1 Exp Researches Oct 14.78 W Carman

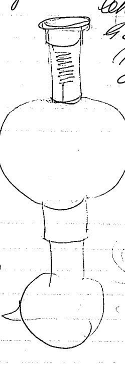
Menlo Park, N. J., 187

Oct 9th 1878

Electric Light

carbon carbon

Chas Batchelor
G E Carman
M N Force
T A E



Borneo
Borneo
Borneo
Borneo
Borneo
Borneo
Born
Carbon
carbon

J Kruesi

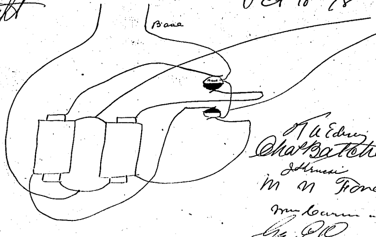
Personally appeared before me this day of
18 , the said Thos. A. Edison,
Chas. Batchelor, John Kreuzi, and Martin Force,
and acknowledged the above to be their signature

Notary Public.

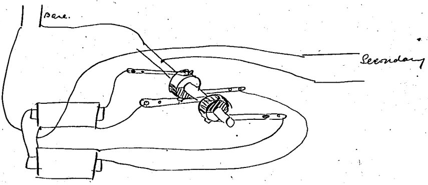
123

Electric Light

Oct 10 78



T A Edison
Chas Batchelor
J Kruesi
M N Force
Wm Carman
Geo E Carman


Base.
Secondary

Electric Light

T A Edison
Oct 10 78
Chas Batchelor
J Kruesi
M. N. Force
Wm Carrigan
Wm Carman

Experiment

1 Fix the Mercury guage and Air Pump

2 Arrange a piece of sheet platina 1/4 wide and very thin 1/5000 in the glass bulb. with proper bindpost for large wire ~~that~~ we may try the effects of a partial or whole vacuum on radiation from the spiral

O.K.

2 ~~Make 2 large cells consisting of~~
Make 2 platina strips 1/8 wide one & the other 1/4 wide both same length 5" having same resistance on Bradley strap 4 with large C and H cell
One foil being twice as thin as other
Arrange the 4 C and H cells to heat either to redness but not to incandescence
These foils to be without regulators and arranged so ~~that~~ glass tubes can be placed over them, which tubes are air tight at top and ground on bottom so that there is no leakage ~~at bot~~ of air
Good solid connections required

J W Lawson

Oct 10 78 T A Edison

Wm Carman
M. N. Force
Geo E. Carman

The idea is to ascertain if we do not gain ~~by~~ increased light by increased surface without alteration of resistance and also to ascertain if the radiation multiplies the effect of increased surface

Chas Batchelor

(3) ~~Make~~ 2 lamps without regulators same as above with ¼ inch foils, very thin, one coiled in cylindrical form and the other straight the edges of cylinder not lapping but butted with smallest crack possible

OK

---

(4) Piece of Platina ¼ in wide to fit double pillar machine rolled if possible 1/10000 inch thick and set in machine.

---

(5) On one of the old style lamp regulators I want a platina point on lever ⅜ long and on the Screw a brass cup containing Mercury in which I place two or three drops of Glycerine

OK

(6) ~~Make~~ With one of the machines made with ⅛ inch foil very thin arranged with a standard candle to see the p.c. of loss with thick and thin tubes of glass over it, the idea being ~~that~~ while

Oct 10-78 T A Edison M. N. Force

glass does not obstruct light in the same ratio as radiant heat hence there may be a gain in amount of light by employing thicker bulbs ~~and~~

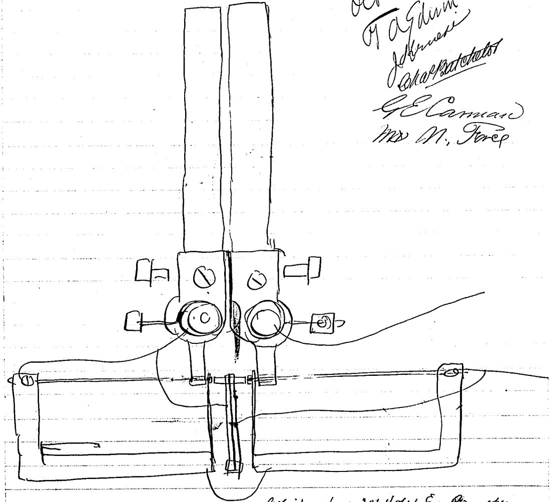
J Kruesi
Wm Carman
Geo E Carman

Chas Batchelor

( ) Arrange on a vertical revolving shaft at 300 per min. a lamp one of old style spiral with regulator securely clamped to the shaft with two ~~heavy~~ rings & heavy connection springs for conveying the current to lamp; idea being to increase quantity of light & diminishing its intensity the spiral must describe a 2in circle.

Make two induction coils of No 3 primary ~~and~~ 2 layers; and No 8 secondary 8 layers Cores 3 inch diameter 12 inch long cast iron, also cast iron backs placed on bases with bindposts for heavy wires —

Electric Light
Oct 12 1878
T A Edison
J Kruesi
Chas Batchelor
G E Carman
Wm N. Force



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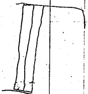
Oct 14. 1878 W Carman

14/32.
16.



Electric Light Oct 14. 1878

TA Edison

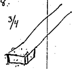
Chas Batchelor

inch surface

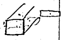
18. ~~1/8~~ 1/2 2 h.p. Geo E Carman

18 ~~3/16~~ 30/32. 1/32 thick. 4 hp Wm N Force

3/8.
6 3/4



250 h.p.



1/8

250,

1/2 1/2

5/8

250 sheets 1/8 wide. 18 inch long } takes 250 h.p.
500 " 1/8. 9 " " 250 hp
1000 1/8. 4 1/2 " "
2000 (" 2 1/4

250, /

8.

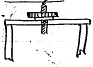
1/2
5/8
3/

20,

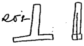
Copied on P 202 Vol 1. Ex'l Researches Oct 14. 1878 Wm Carman

Kruesi, [illegible] 14th 1878

I want an adjustment on top of the 'bridge' to draw up the Pla[illegible]a so:



Also I should like to have some lighter way of holding the ends of the platina instead of the brass clamps with two screws thus:- say a piece of brass in shape of a T & slitted so:- & then clamped down on to the platina



All the 4 springs must be fastened together & have them here at the bottom of the rod so that they go together

These alteration will complete this one & I shall alter the others somewhat but that will not make any difference to outside castings of which I would get 6 sets

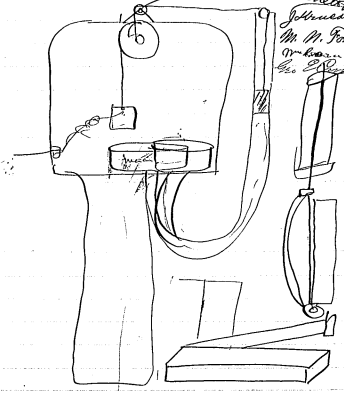
B

T. A. EDISON.

Menlo Park, N. J., Oct 13 1878

Electric Light

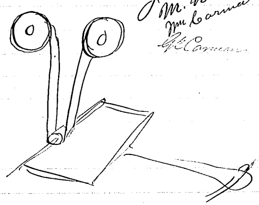
T A Edison
Chas Batchelor
J Kruesi
M. N. Force
Wm Carman
Geo E Carman

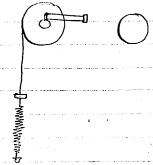


T. A. EDISON.

Menlo Park, N. J., Oct 13th 1878

Thos A Edison
Chas Batchelor
J Kruesi
M. N. Force
Wm Carman
G E Carman

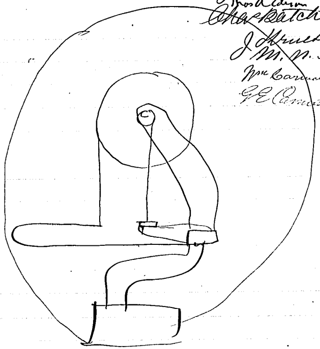




T. A. EDISON.

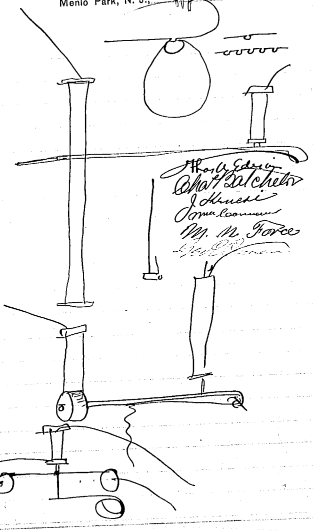
Menlo Park, N. J., Oct 15th 1878

Thos A Edison
Chas Batchelor
J Kruesi
M. N. Force
Wm Carman
G E Carman



T. A. EDISON.

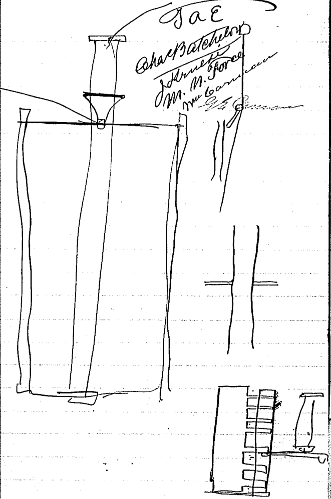
Menlo Park, N. J., Oct 15th 1878



Thos A Edison
Chas Batchelor
J Kruesi
Wm Carman
M. N. Force
Geo E Carman

. EDISON.

Menlo Park, N. J., Oct 15 1878



TAE

Chas Batchelor

J Kruesi

M. N. Force

Wm Carman

Geo E Carman

Electric Light
Sub Div.

Oct 16th 1878

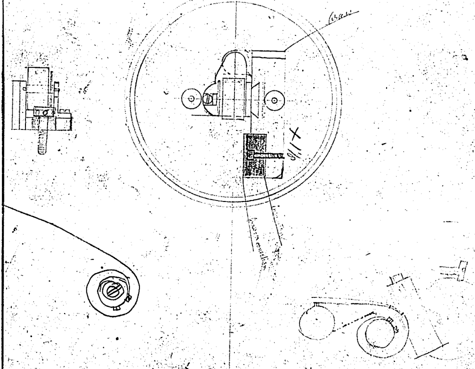
J Kruesi

Chas Batchelor

M. N. Force

Wm Carman

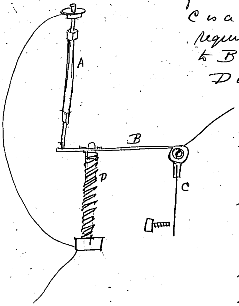
Geo E Carman



Electric Light   Oct 17 1878.

Experiment

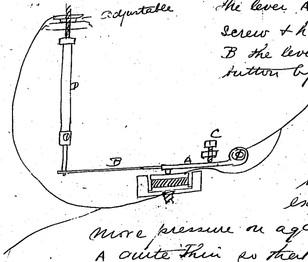
A is platina foil as we use it fastened to lever B
C is a spring which gives the requisite amount of flexibility to B
D is a platina spiral wound close together and with a loose core of fibre this spiral is closed so as to short circuit by the expansion letting down the lever B
Spiral D ought to be 2 inch long and made of about 26 or 28 platina wire



Chas Batchelor
J Kruesi
M. N. Force
Thos A Edison
Wm Carman
Geo E Carman D

Electric Light   Oct 14th 1878 126

Kruesi
Make an experimental instrument like sketch



the lever A is fastened by a shoulder screw + has on its end a spring B the lever is kept down on the button by screw C and when set the force D lifts the spring sufficiently to take the pressure off the button and as it expands it allows more pressure on again. Make lever A quite thin so that it will be slightly springy

Chas Batchelor
J Kruesi
M. N. Force
Thos A. Edison
Wm Carman
Geo E Carman

1/

138

Electric Light Oct 14 1878

Thos A Edison

Experiment Chas Batchelor

Jno Carman M N Force J Kruesi

A is a single layer spool of Geo E Carman

No 12 wire about 2½in long and

hole about 7/16

B is a core hung on platina

foil C which coils up on a

wheel on shaft

E is a spring which balances

the weight B

The shaft has two stop points

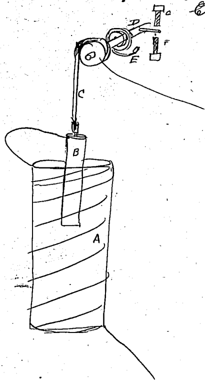
F + G

When current comes in B

is near middle spool,

When platina heat its resistance

is higher + the magnet lets

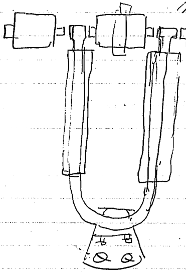


Wait on this

Menlo Park, N. J., 187

Electric Light Oct 18 1879

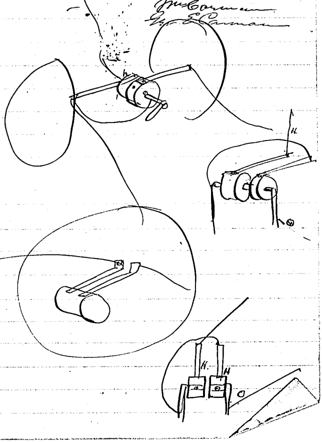
T A Edison
Chas Batchelor
J Kruesi
Wm Carman
M. N. Force
Geo E Carman



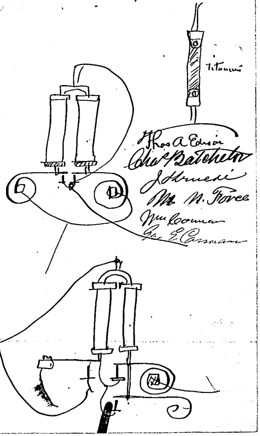
T. A. EDISON. Electric Light Oct 18. 1878

Menlo Park, N. J., 187

Thos A Edison
Chas Batchelor
J Kruesi
M. N. Force
Wm Carman
Geo E Carman



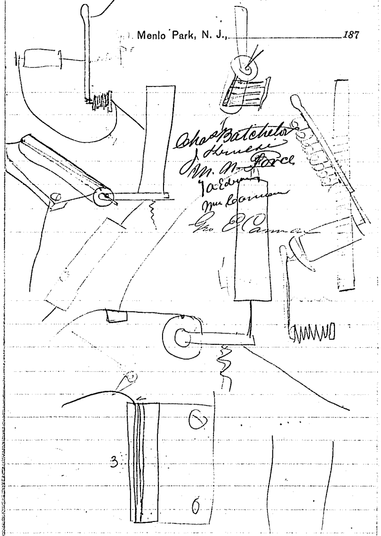
Electric Light Nov 18 1878



Thos A Edison
Chas Batchelor
J Kruesi
M. N. Force
Wm Carman
Geo E Carman

T. A. EDISON.
Electric Light Nov 18 1878

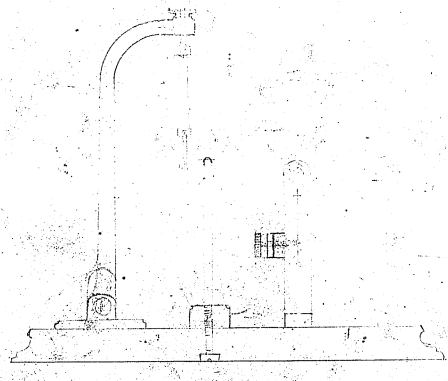
Menlo Park, N. J., 187



Chas Batchelor
J Kruesi
M. N. Force
TA Edison
Wm Carman
Geo E Carman

Electric Light [illegible]

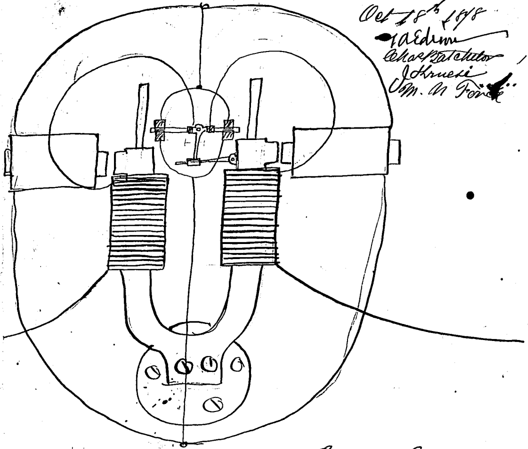
T A Edison
G E Carman
Wm N Force
Chas Batchelor
Wm Carman
Geo E Carman



Electric Light 123

Oct 18th 1878

T A Edison
Chas Batchelor
J Kruesi
M. N. Force

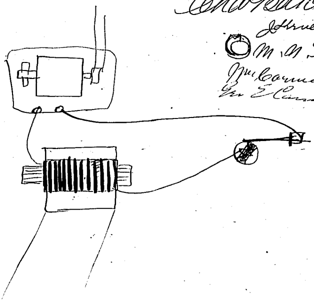


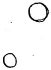
Edison's Magneto Electric Generator

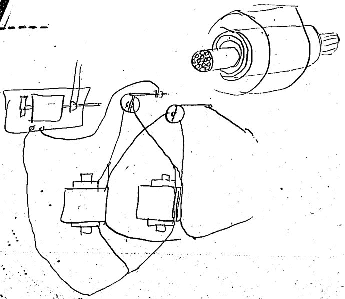
Copied on P. 203 Vol 1 Exp Researches Oct 19. 78
W Carman

Electric Light.

Oct 20 1878
T A Edison
Chas Batchelor
J Kruesi
M N Force
Wm Carman
Geo E Carman







Electric Light.

Oct 20 1878
Wm Carman
T A Edison
Chas Batchelor
M. N. Force J Kruesi
Geo E Carman

I propose to use two or more induction coils arranged with commutators on a small quantity magneto machine; this commutator throws the current from the magneto first into one primary & thence to the others, without breaking the continuity of the magneto circuit. The same Commutator also throws the secondary in circuit of a main wire ~~[illegible]~~ simultaneously with the ~~the~~ taking off of the primary & so on := I hope by this means to get a current which may be opened and closed without interfering with the magneto machine, also to conveniently obtain any tension required and to prevent loss of power by dispensing with a great amount of dead magnet wire, weight etc in a magneto machine,

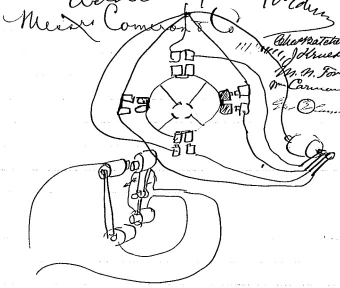
T. A. EDISON.

37

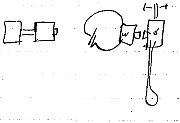
Menlo Park, N. J., Oct 21st 1878

Electric Light TA Edison

Messrs Comeron & Co



Chas Batchelor
J Kruesi
M. N. Force
Wm Carman
Geo E Carman

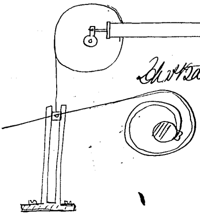


T. A. EDISON.

Menlo Park, N. J., 187

Electric Light Oct 21. 8

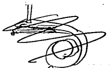
Wm Carman
J Kruesi
M. N. Force
TA Edison
Chas Batchelor
Geo E Carman

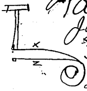


T. A. EDISON.

Menlo Park, N. J., ~~187~~

Kruesi

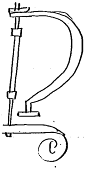




T A Edison
J Kruesi
~~G E Carman~~
~~M N Force~~
Wm Carman
Geo E Carman

Make the spring on the new lamp like this Z is the 4 springs and X is a piece of spring as wide as all 4 springs fast at Y.

Also make only one upright instead of 2. this way



Also make the platina strip so long that it will come central in the glass globe

Batchelor
Oct 21 1878

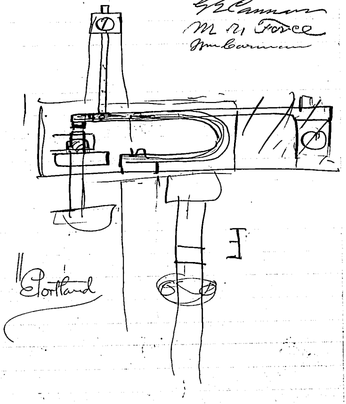
T. A. EDISON.

Menlo Park, N. J., Oct 22d 1878

Electric Light

J Kruesi

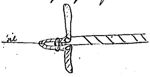
Chas Batchelor
T A Edison
G E Carman
M N Force
Wm Carman

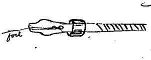


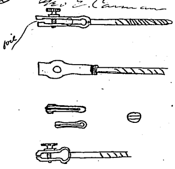
Electric Light

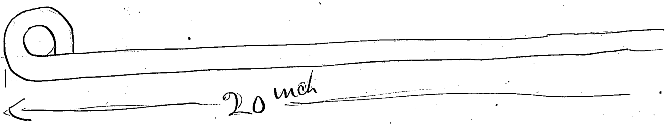
Oct 22nd 1878
T A Edison
Chas Batchelor
M N Force
J Kruesi
Wm Carman
Geo E Carman

Clamp for foil:








20 inch

E. 'Light' Experiments to be tried
Oct 22 1878.

1 Arrange a piece of Platina 1/4 inch wide and very thin 1/5000 in the glass bulb with proper bindposts for large wire that we may try the effects of a partial or whole vacuum on radiation from the spiral.

—— " ——

2. Make 2 platinum strips one 1/8 wide ~~one~~ & the other 1/4 wide both same length and having same resistance on Bradley strap 4 with large Condit & Hanson cell. One foil being twice as thin as other. Arrange the four Condit & Hanson cell to heat either to redness but not to incandescence. These foils to be without regulators and arranged so that glass tubes can be placed over them which tubes are air tight at top and ground in bottom so that there is no leakage of air good solid connections required.

—— " ——

The idea of No 2" is to ascertain if we do not gain increased light by increased surface without alteration of resistance and also to ascertain if the radiation nullifies the effect of increased surface.

—— " ——

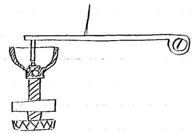
3." Make 2 lamps without regulators same as above with 1/4 inch foils, very thin, one coiled in cylindrical form and the other straight the edges of cylinder not lapped but butted with smallest crack possible.

Oct 22 = 1878

4 Make a piece of Platina $\frac{1}{4}$ in wide to fit double pillar machine rolled if possible $\frac{1}{10000}$ inch thick and set in machine —

— " —

5 On one of the old style lamp regulators, we want a platina point on lever $\frac{3}{8}$ long and on the screw a cup containing mercury in which we place a few drops of Glycerine —



— " —

6 With one of the machines made with $\frac{1}{8}$ inch foil very thin arranged with a standard candle to see the per centage of loss with thick and thin tubes of glass over it, the idea being that while glass does not obstruct light in the same ratio as radiant heat hence there may be a gain in amount of light by employing thicker bulbs

— • —

7 Arrange on a vertical revolving shaft at 300 per min a lamp one of old style spirals with regulator securely clamped to the shaft with 2 rings with heavy connections springs for conveying the current to lamp, the idea being to increase quantity of light and diminishing its

Electric Light.

154

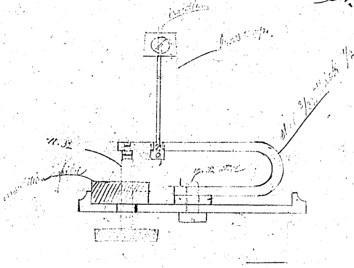
16

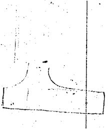
3. Apparently great difference — coiled-one gives most light. more noticeable on the little Weston machine. the coiled-one measured ·07 ohms and the flat one ·11 ohms

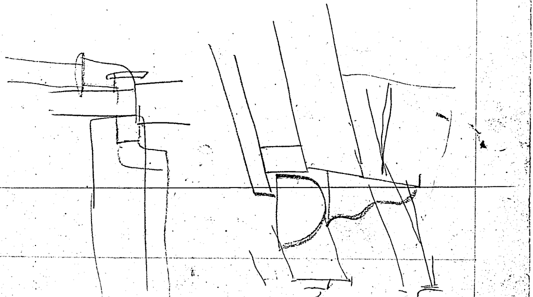
~~Oct 31~~ Nov 3 1878
Chas Batchelor

Electric Light Oct 22d 1878

J Kruesi
M. N. Force
Chas Batchelor
T A Edison
Wm Carman
Geo E Carman

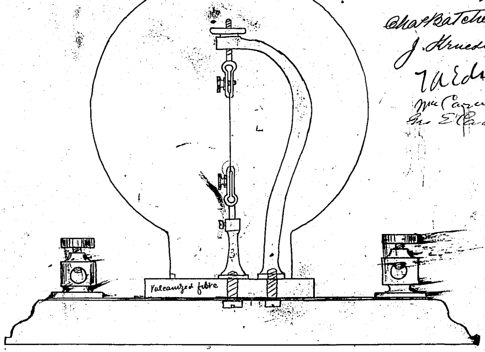

n. 32
n. 32 wire
3/64 inch





Electric Light

Oct 23 1878
Chas Batchelor
J. Kruesi
T A Edison
Wm Carman
Geo E Carman



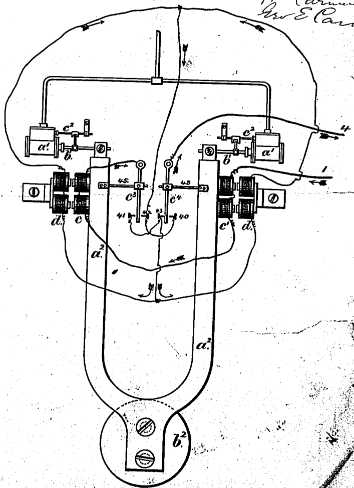
Kruesi. Make me two instruments like drawing
One to have platina foil ¼ inch wide 1 inch long
the other to have " " ⅛ inch wide 1 inch long
¼ inch wide to be twice as thin as ⅛ inch
They must both test same resistance.
Glasses must be ground so that they will not let
air in when a little grease is on plate
Chas Batchelor

Kreusi Please make model for Patent Off
Oct 25th 1878 Batchelor

Also give me one of the regular spiral lamps for model.

T A Edison
J Kruesi
M. M. Force
Wm Carman
Geo E Carman

Fig. 1.



c²
c²
a'
a'
b
b'
4
1
45
45
c³
c⁴
41
42
43
40
d
c
c'
d
a²
a²
b²

Oct 26 1878

T A Edison

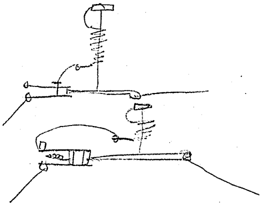
J Kruesi

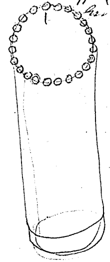
M N Force

Chas Batchelor

Wm Carman

Geo E Carman





Experiments

T A Edison

Abels Fuse,

Subsulphide Copper.

phosphide Copper.

powdered & pressed in cylinder,

very sensitive to heat,

the greater the proportion of phosphide Copper —

Res decreased as more subsulphide used

Wm Carman

M N Force

Johnson

Chas Batchelor

Oct 26 1878.

Geo E Carman

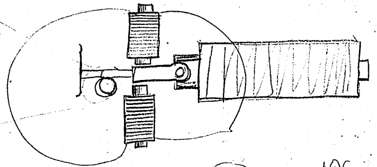
50,000,

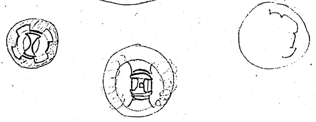
Portland St.

Portland

Portland

Portland





100

50
60
3000,

Electric

Oct 20 1878

TAE

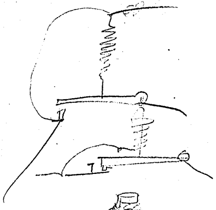
J Kruesi

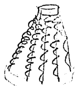
~~Boston~~ Book M M Force

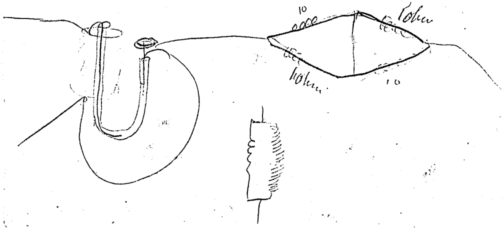
Boston Boston Chas Batchelor

Billy Jno Carman

Geo E Carman







Menlo Park, N. J., 187

TAE

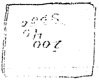
M M Force

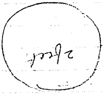
J Kruesi

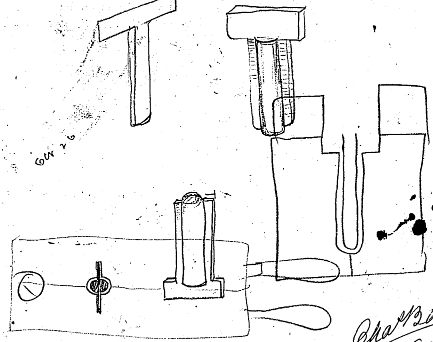
Chas Batchelor Oct 20 1878

Jno Carman

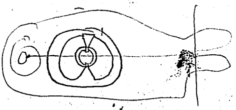
Geo E Carman



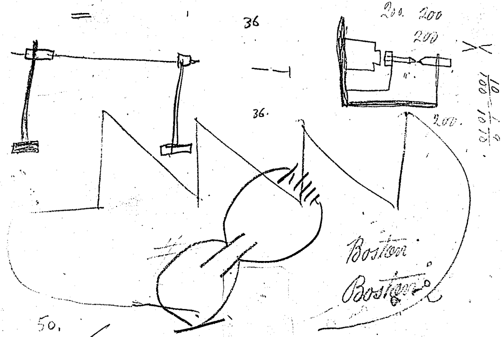




Oct 26



Chas Batchelor
T A Edison
J Kruesi
M. N. Force
Jno. Carman
Oct 26 1878
Geo E Carman



36
200. 200
200
36.
200.
100 10 10
Boston
Boston

50.

TAE

Jm n Force

Chas Batchelor

Wm Carman

Oct 26 1878

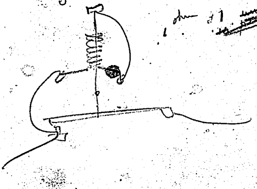
Pressure

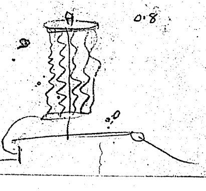
15

$\frac{100}{5} = 20 \quad \frac{100}{10} = 10 \quad \frac{1}{4}$

1 ohm #1 ~~[illegible]~~ 1/17 candle.

0.8





Fundamental experimts

paint the platina with.

"

Asphaltum.
white lead paint.
all the pigment paints

Oct 27/78
TAE
M N Force
Chas Batchelor
Wm Carman
Geo E Carman

Mould platinum Block under great pressure in split mould.

Make a Carbon of a mixture of
1/2 Carbon 1/2 Rutile =

Make a cylinder of 2/3 platina black 1/3 of precipitated Chalk, use for incandescence,

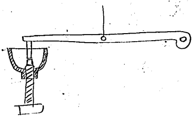
Electric Light

Mr Kruesi

Oct 27 1878

Chas Batchelor
J Kruesi
Wm Carman

Make on one of the old style regulators on one of ~~the levers a point~~ 3/8 of an inch long and on the end of screw put a cup which will hold a few drops of glycerine as in this sketch



T A Edison

M N Force
Geo E Carman

Push along ~~the two induction coils~~.

Make the bottom platina holders lighter.

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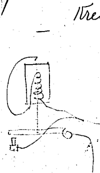
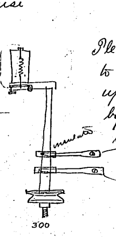
Electric Light
Kruesi

T A Edison

Oct 27 1878
Geo E Carman
Wm Carman
Chas Batchelor
J Kruesi
M N Force





Please make an old regulator Camp to revolve on a shaft 1 inch out of centre upright and carry connections to it by springs (heavy) one (the top) collar insulated & connected to regulator lever

Put these up on table upstairs and set running from shaft underneath

L

168

Electric Light

Oct 27 1878

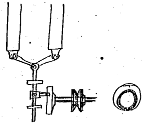
Chas Batchelor

TAE

M. N. Force

J F Carman

J Kruesi



Electric Light

Oct 31 1878

TAE

Chas Batchelor

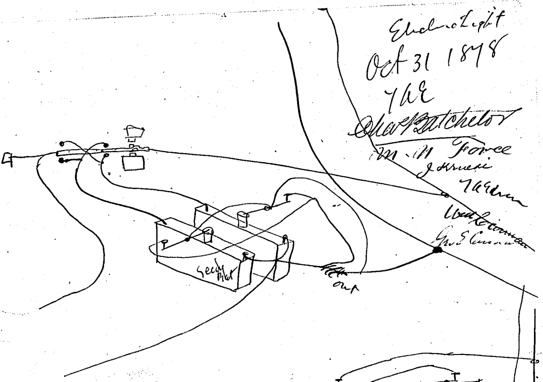
M. N. Force

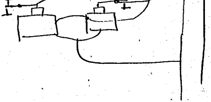
J Kruesi

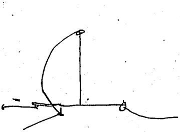
TA Edison

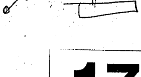
Wm Carman

Geo E Carman



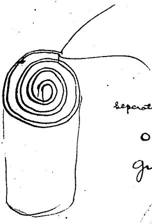






Electric Light Nov 1 1878 TAE

Batch get 4 large say 10 gallon Crocks. for Secondary batteries. & get some sheet lead 1/16th thick & foot or foot & 1/2 wide wind thus



TAE

separate by solid soft rubber this size ○ or strips 1/16 thick of gum rubber cloth.

Wm Carman
Chas Batchelor
M N Force
J Kruesi

Try platinized Carbon see Watts Dic - page 762. under "Carbon"

Boron combines with platinum, Try alloys of Boron & ~~Patl~~ Platinum, or Iridium - Silicium & Plat etc all the infusible metals one with the other

Boron unites easily with plat. See Watts Dic. "Boron" page 629

Electric Light Nov 1st 1878

J Kruesi

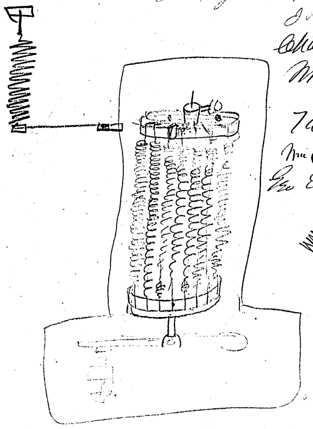
Chas Batchelor

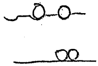
M N Force

T A E

Wm Carman

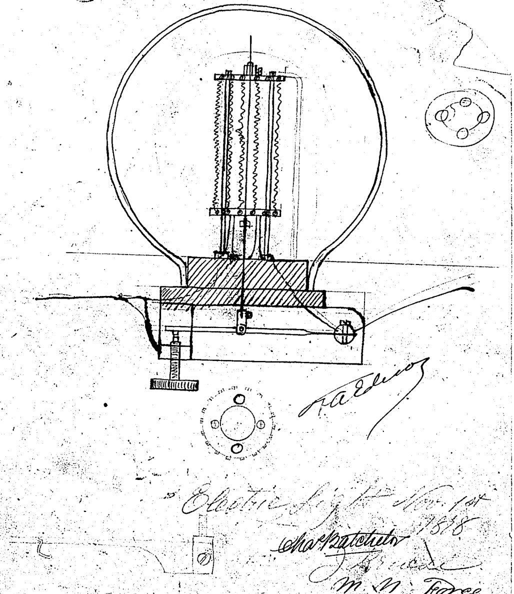
Geo E Carman





Batch make drawing of this

20 spirals finest platina wire. twice the length of those in the other lamp



T A Edison

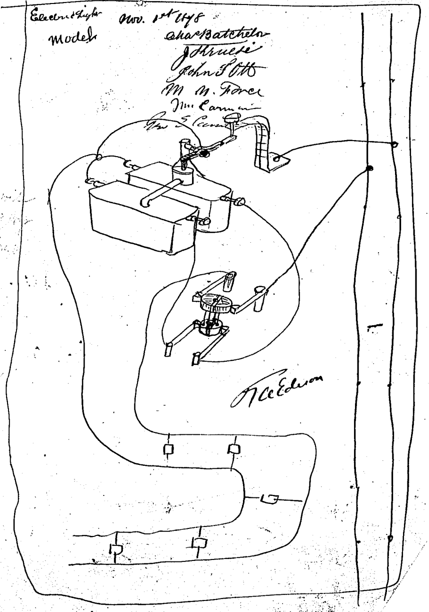
Electric Light Nov. 1st 1878

Chas Batchelor
J Kruesi
M N Force
Wm Carman
Geo E Carman

Electric Light Model

Nov. 1st 1878

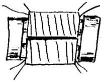
Chas Batchelor
J Kruesi
John F Ott
M. N. Force
Wm Carman
Geo E Carman



T A Edison

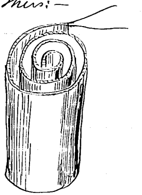
intensity. The spiral must describe a 2^{in} circle

*8. Make two induction coils of No 3 primary 2 layers; and No 8 secondary 8 layers. Cores 3 inch diameter 12 inch long cast iron also cast iron backs placed on bases with bindposts for heavy wires We decide to make this in this manner.



Cores with closed armatures at each end

9 Get 4 large 10 galls. crocks for secondary batteries & get some Sheet-lead $\frac{1}{16}$ thick and 12 inch wide wound thus:-



Separated by solid soft rubber this size ○ or strips $\frac{1}{16}$ thick of Gum rubber cloth.

10 Try platinized Carbon. See "Watts dic" page 762 under "Carbon"

~~Oct 22nd~~ 1898 Nov 1st 1898

11 Boron combines with Platinum
Try alloys of Boron and Platinum, or
Iridium — Silicium and Platinum etc
all the infusible metals one with the other
Boron unites easily with platinum See
Watts' dic. Boron page 629.

12 Is oxide of Ruthenium a conductor
if so it cannot be melted by the
Electric Arc.

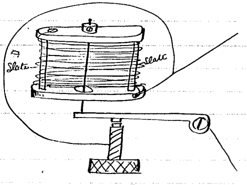
13. Eh !!! Tungsten Alloy with iron!!!
Iron is the only metal which alloys
with Tungsten in all proportions up to
80 per cent of the latter with which pro-
portion a mass is formed not fusible
at any attainable temperature
p. 898 Watts Dic. Tungsten "Quid Vide."

14 Get Tungstic Oxide, (i.e) Wolframine
or wolfram ochre.

15 Platinum and Cadmium alloy.
100 parts of platinum at a red heat retain
117.3 parts Cadmium. The alloy is almost
silver white — very brittle, very fine grained
and refractory in the fire
Vide Watts' Cadmium page 703.

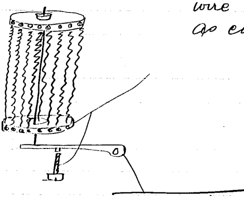
Nov 1st 1878

16 =



Make an instrument like this:- Platina wire wrapped round two pillars of slate and regulator wire through middle as in sketch the wires in passing backwards and forward come close to wire & each other to take the effect of radiation —

17 Make a spiral instrument so = 20 spirals of finest platina wire two inches long put as close together as possible



18.

Nov 1 1878 Electric Light

T A Edison

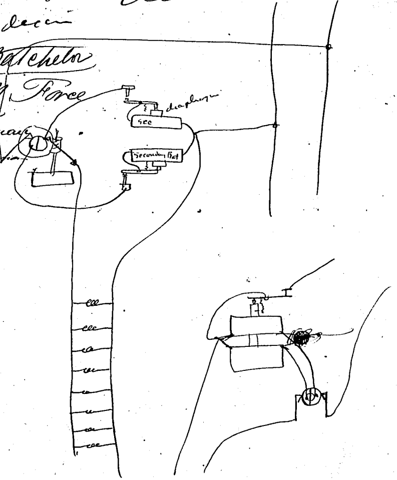
Chas Batchelor

M. N. Force

J Kruesi

Wm Carman

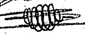
Geo E Carman


diaphragm
Sec
Secondary Bat

Electric Light Nov 20. 1878

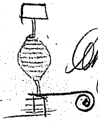
Make a cylinder of Peroxide of Iron with small percentage of platinum in it and test for conductivity TAE

Design ~~a lamp with 6 platinum platinum wire in circle~~



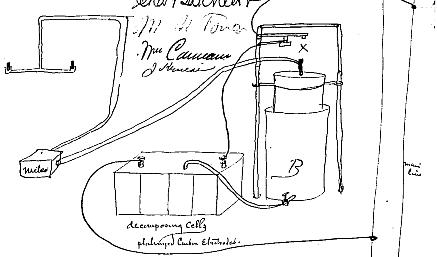
Take sheet & bend it round & braze use ~~Oxy~~ Hydrogen flame & blow pipe

Spiral ~~tubing~~



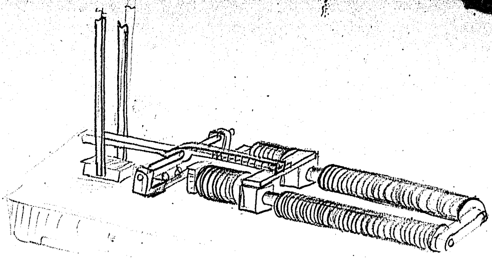
Chas Batchelor
M N Force
Wm Carman
J Kruesi

Nov 2 1878
T A Edison
~~Chas Batchelor~~
M N Force
Wm Carman
J Kruesi



when the gasometer is full the cylinder that rises lifts the lever at X from its Contact point and opens the circuit, If now the gas is lit in the house The cylinder falls & closes the circuit and the Current gives more gas; The gas burner may be Either a fine capillary tube with the jet playing against lime Zirconium oxide etc or it may percolate through cylinders of that substance, or a plug of finely divided metallic Iridium or palladium may be used it percolating through ~~that~~ the Iridium helps to set it on fire by catalytic action. and at the same time the Iridium plug becomes incandescent, to prevent Explosion the gas may pass ~~through~~ gauze or fine wires laid longitudinally ~~in tubes~~ =

This method I call lighting by Electrolysis =



36 inch

1/3

Nov 2 1878

TAE

Chas Batchelor
Wm Carman
John Kruesi
M N Force
Geo E Carman

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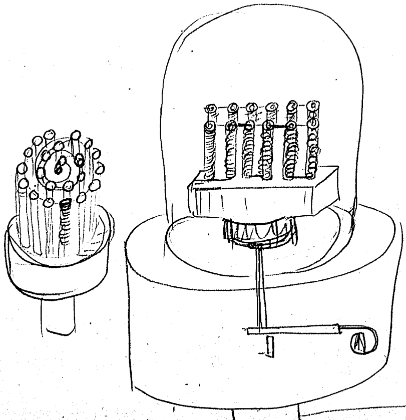


Nov 2 1878

TAE

M N Force
John Kruesi
Chas Batchelor
Wm Carman
Geo E Carman

183

T. A. EDISON.

Menlo Park, N. J., Nov 2 1878

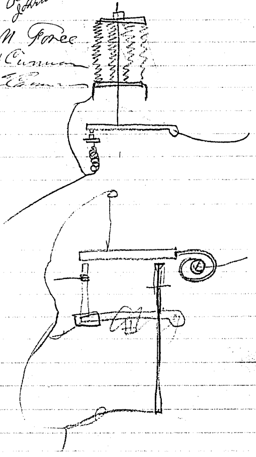
TAE Chas Batchelor

J Kruesi

M. N. Force

Wm Carman

Geo E Carman



T. A. EDISON.

Menlo Park, N. J., Nov 2 1878

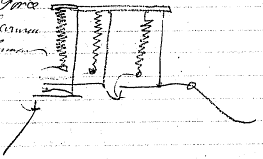
TAE Chas Batchelor

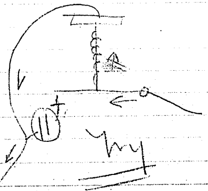
J Kruesi

M. N. Force

Wm Carman

Geo E Carman





Lesser spark

Magneto Nov 2 1878

T A Edison

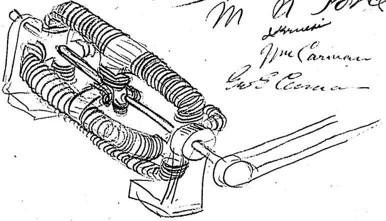
Chas Batchelor

M N Force

J Kruesi

Wm Carman

Geo E Carman



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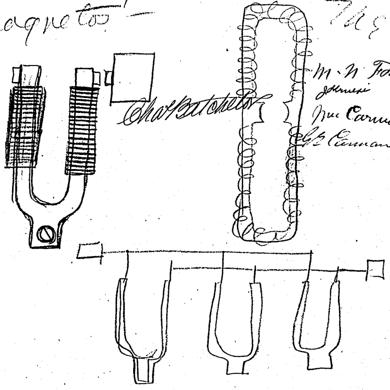
Electric Light. Nov 2 1878

magnetos —

TAE



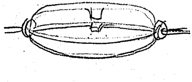
Chas Batchelor

M N Force

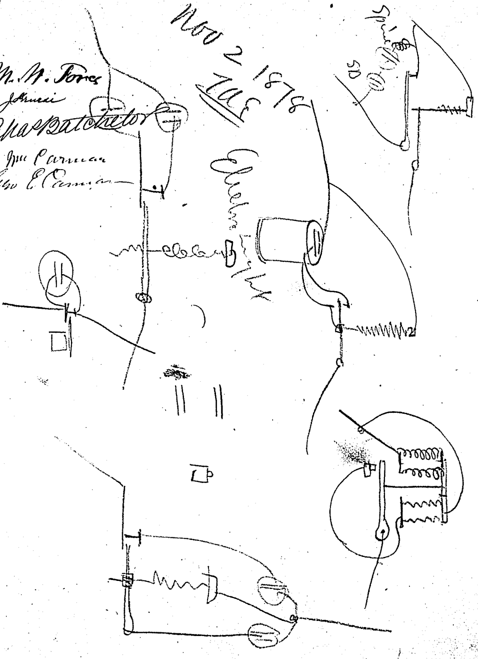
J Kruesi

Wm Carman

Geo E Carman



187


Electric Light
Spring
SD
2

Nov 2 1878

TAE

M. N. Force
J Kruesi
Chas Batchelor
Jno Carman
Geo E Carman

Electric Light Nov 20 1878

J Kruesi

Chas Batchelor

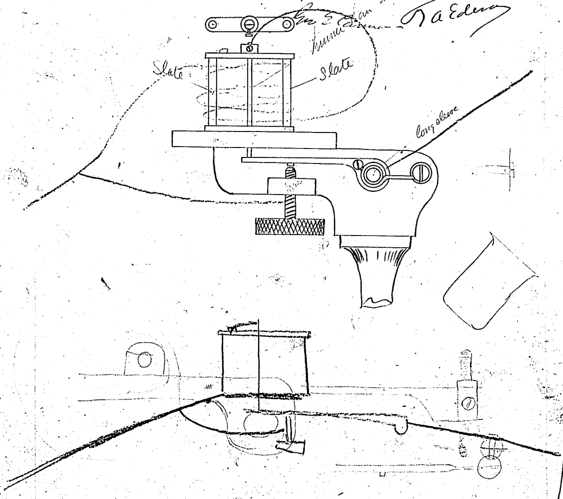
M N Force

Wm Carman

Geo E Carman

T A Edison

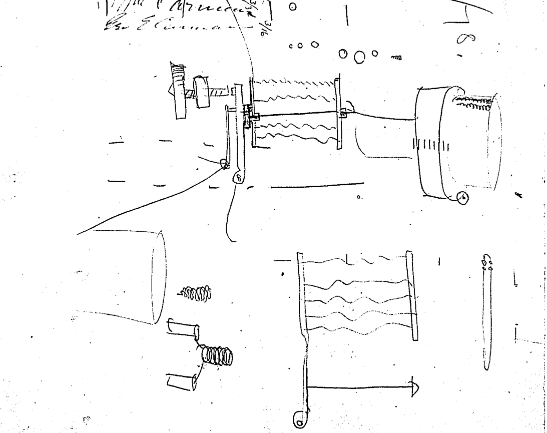
Look as we always use



Slate
Slate
Long sleeve

T A Edison
M. N. Force
J Kruesi
Chas Batchelor
M. N. Force
Wm Carman
Geo E Carman

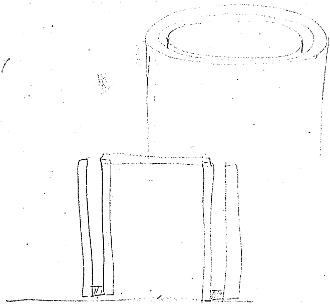
Nov 3/78

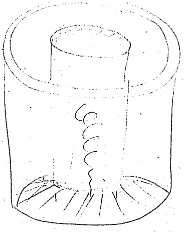

3/32
1/2
4½
3/32
3/16

461 00
69.15
391.85

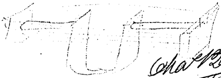
Electric Light Nov 3rd 1878

J Kruesi
Chas Batchelor
M N Force
TA E
Wm Carman
Geo E Carman

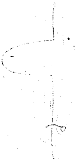


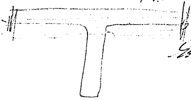


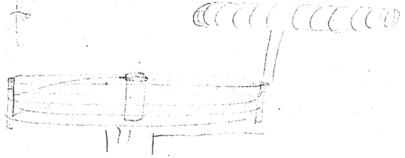
Electric Light Nov 3d 1878
J Kruesi

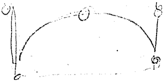


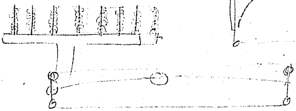
Chas Batchelor
M N Force
J A E
Wm Carman
Geo E Carman

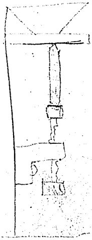


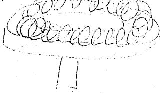








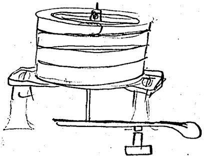




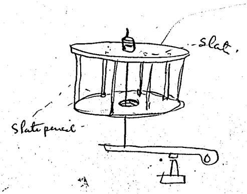
Electric Light Nov. 4th 1878

Model patent office

J Kruesi
Chas Batchelor
M N Force
T A Edison
Wm Carman
G Carman



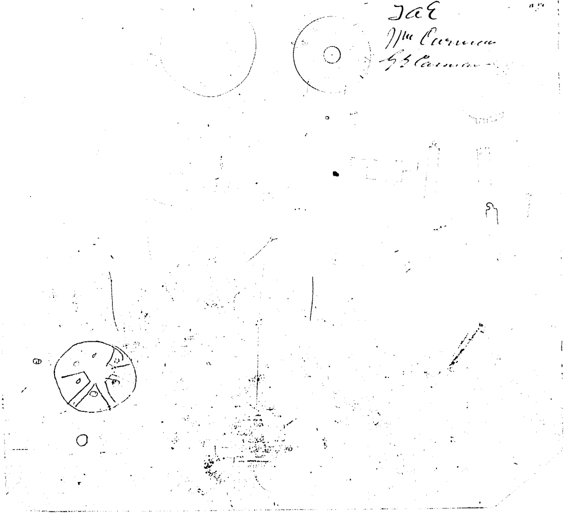
platina foil 3/16 inch wide wound around a slate drum thus



Electric Light Nov 4th 1878 Menlo

2 Wheels 1⅛ Diam 48 Teeth.

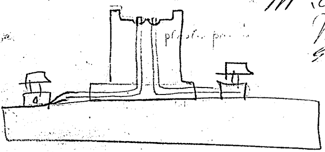
Chas Batchelor
M. N. Force
TAE
Wm Carman
G E Carman



Nov 4th 1878

J Kruesi

T A Edison
Chas Batchelor
M N Force
Wm Carman
G E Carman


plaster paris

Nov 5th 1878

Chas Batchelor

Edison took a piece platina wire ·003 thick and 12 inches long measuring 3·23 ohms at 72° Fahr, he coiled it up fine so ~~———~~ and afterwards made five turns of it so ~~ooooo~~. With 4 large Condit and Hanson cells this was heated (and kept so) to a little above red about 1000° Fahr. which was about 8·12 ohms

196

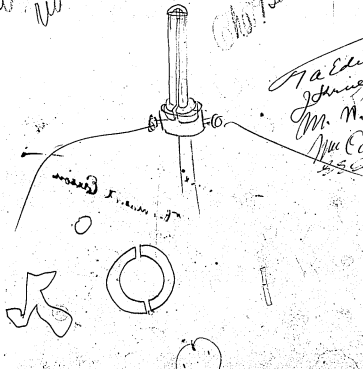
70 - 30.

J Kruesi

Platinum Incan Lamp

Nov 5th 1878

~~Chas Batchelor~~



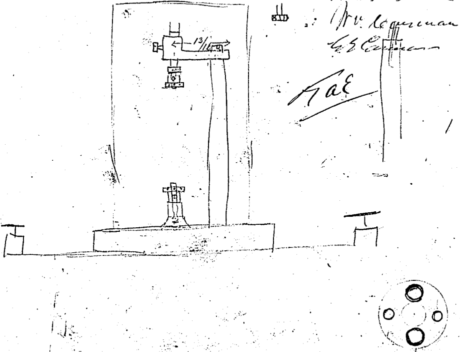
T A Edison
J Kruesi
M. N. Force
Wm Carman

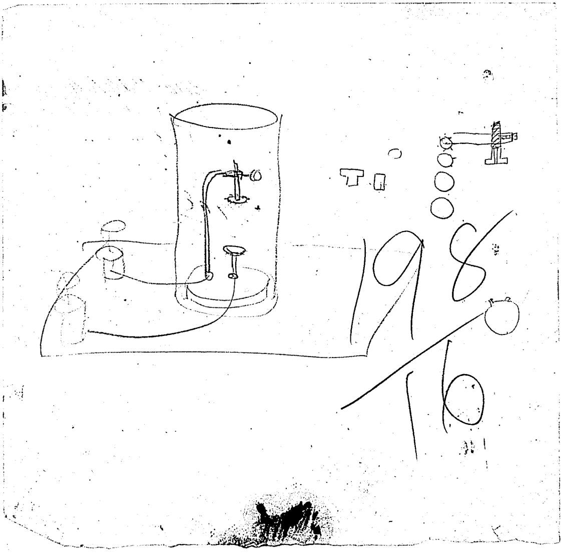
197

Electric Light Nov 5th 1878

J Kruesi
Chas Batchelor
M N Force
Wm Carman
G E Carman

TAE

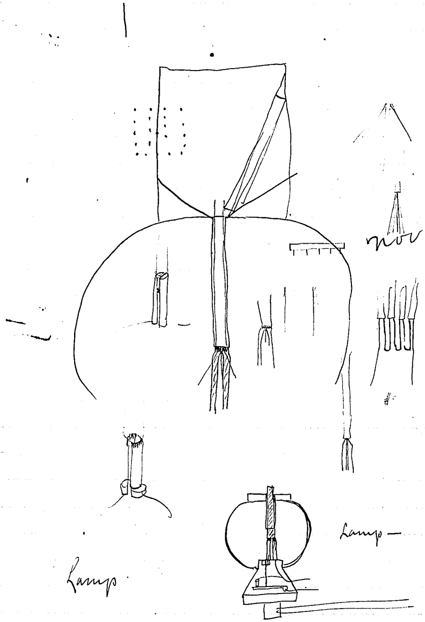



198
16

i . 40 .

~~24/2~~ 20

- 10



Nov 5 1878
T A Edison
Chas Batchelor

Alloy of ~~p~~ platinum & Cadmium

"100 parts of platinum at a red heat retain 117.3 parts Cadmium. The alloy is almost silver white—very brittle, very fine grained & refractory in the fire"
Watts "under "Cadmium" page 703

Is oxide of Ruthenium a Conductor if so if cannot be melted by the Electric Arc

Get some · Pitchblende

Eh! - Tungsten alloy with iron -

"Iron is the only metal which alloys with tungsten in all proportions up to 80 per cent of the latter with which proportion a mass is formed not fusible at any attainable temperature"
pag 898 Wats Dic. Tungsten

get tungstic oxide, (i e wolframine or wolfram ochre

J Kruesi

Wm Carman

TAE

Unequal Number of convolution on given Spaces on the ring —

Unequal dividing of the sections,

Poor insulation,

Copper wire of poor conductivity,

Iron of poor magnetic conductivity,

Poor facilities for oiling

Poor facilities for taking care of heat in machine to prevent accumulation.

Non ~~ult~~ ultimate utilization of heat from machines —

Wm Carman
J Kruesi
M N A

Nov. 6. 1878 T A Edison

New Method of ~~deco~~ Electric Lighting

Chas Batchelor

Decompose water into Oxygen & Hydrogen these gases impinges upon a platinum sponge or foil or Cylinder and are ignited by the calylytic action of the platina. This power may be assisted by passing a current through the platinum.

Chas Batchelor

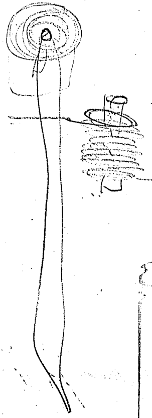
75.

M N Force

Wm Carman

J Kruesi

201/16



201

Three sheets annexed to
eight Apr 19, 1880
McLenney

202/16

202

Electric Light Nov 6. 1878

6 spirals ·005 = 1 spiral of ·008

$2 = \sqrt{3.25^2 + 3.25^2} = \sqrt{10.56 + 10.56} = \sqrt{21.12} = \overset{m.}{4.60}$

$4 = \sqrt{4.60^2 + 4.60^2} = \sqrt{21.16 + 21.16} = \sqrt{42.32} = 6.50$

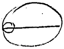
$6 = \sqrt{6.50^2 + 4.60^2} = \sqrt{41.25 + 21.16} = \sqrt{62.41} = 7.90$

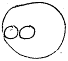
nearly $\frac{8}{1000}$ =

T A E
Wm Carman
M N Force
J Kruesi

$\frac{1}{16}$

$\frac{1}{16}$ wire = how many 005





16/1000
63
65

6 = 12

6 = 12¼
12 = 17.32
24 24.45
48 33
96 42
192 51
384 60

$\sqrt{12.25^2 + 12.25^2} = \sqrt{150 + 150} = \sqrt{300}$

$= 17.32$

$\sqrt{17.3^2 + 17.3^2} = \sqrt{299.30 + 299.30} = 598.$

$\sqrt{24\cancel{45}^2 + 24.45^2} = \sqrt{600 + 600} = \sqrt{\underline{\underline{1200}}}$

203

6 spirals of 3' = 1 spiral of 8''
try it

Electric Light
Nov 6. 1878

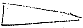
41·85 - 7·3
42·42 7·35
43·00 7·4

3' wire = $7{\cdot}0686$ area
$\times 6$
$42{\cdot}4116$

$7{\cdot}35 = 42{\cdot}42.$
$8'$ in $= 50{\cdot}2656$

7 /

6 of 3 = x



TAE
Wm Carman
J Kruesi

$2 = \sqrt{3^2+3^2} = \sqrt{9+9} = \sqrt{18} = 4{\cdot}24$

$4\ \sqrt{4{\cdot}24^2 + 4{\cdot}24^2} = \sqrt{17{\cdot}97+17{\cdot}97} = \sqrt{36{\cdot}\cancel{\ }}$ 6

$6\ \sqrt{6^2 + 4{\cdot}24^2} = \sqrt{36+18} = \sqrt{54}$ $7{\cdot}34$

$\cdot 7854 \times 6 = 4{\cdot}7124$ $\qquad$ $\cdot 7854 \times 4 = 3{\cdot}1416$

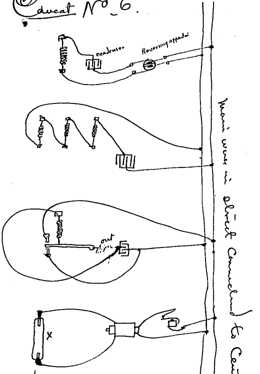
$4{\cdot}712$ $\qquad$ $2{\cdot}40$

$\frac{1}{8} = 9/16 =$ $\qquad$ $\cdot 012272 \times 6 = \cdot 073632$

$\cdot 125$ $\qquad$ $\cdot 125$
1000

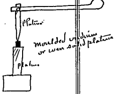
Caveat No 6.

Nov 6 1878


condenser
Reversing apparatus
out
X
Main wire in street connected to Central Station

X-tube filled with smoke
such as Sal ammoniac smoke
jump spark in Vacuo
makes smoke incandescent.

a stick of finely divided Conductor
mixed with large quantity of non
Conductor may be used in tube
+ quantity jump spark used =


Platina
moulded iridium
or wen solid platina,
Platina

Chas Batchelor

J Kruesi

Electric Light

Nov 6 1878

1.95 TAE

Chas Batchelor

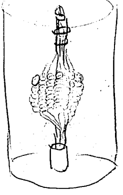
M N Force

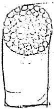
Wm Carman

J Kruesi

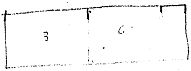
Portland

Portland



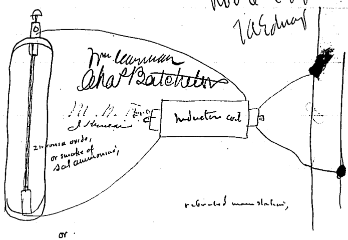


3/4 × 3/4



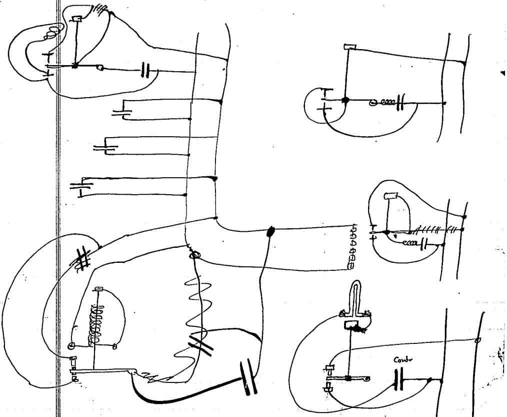
Platina foil dipped Portland
in nitrate of Zirconia Portland Portland
Lime, Magnesia
etc & decomposed
leaving the oxide thereon
to insulating the platina
bunch a lot of spirals together

Nov 6 1878
TA Edison


Induction coil
Zirconia oxide, or smoke of sal ammoniac;
vibrated main station;

Wm Carman
Chas Batchelor
M. N. Force
J Kruesi

or

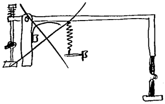


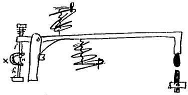
Use of Condensers —
for Sub dividing.

Principle.

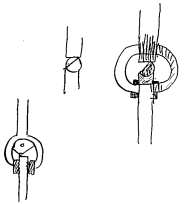
fig 7

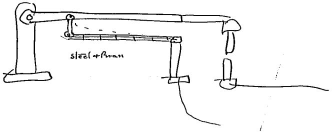
Nov 6 1878
T A Edison
Chas Batchelor
M N Force
Wm Carman
J Kruesi





x insulator
n a small peace of metal which ~~might~~ heats by Not making good contact This heat is communicated to the rods h. i. and expands this seperating the Carbon Electrodes and if the arc is broken the rod i. h. cools & allow the Carbons to touch again; It has a Knife Edge arrangement to adjust the heating of n.





Electric Light
by decomposition

T A Edison

Nov 6/1878

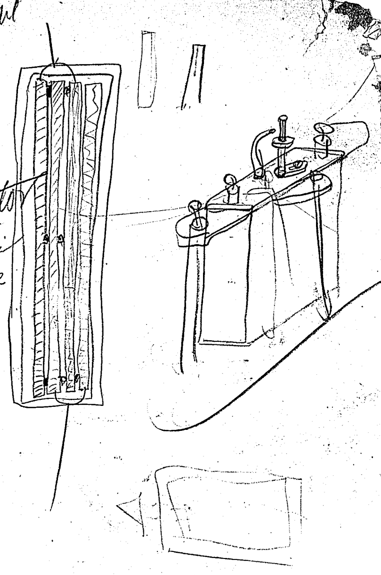
Chas Batchelor

J Kruesi

M. N. Force

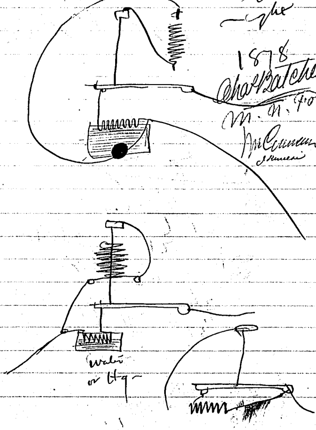
Wm Carman

[illegible] Carman



Nov 6 [illegible]
TAE
[illegible]

1878
Chas Batchelor
M. N. Force
Wm Carman
J Kruesi



Menlo Park, N. J., 187

T. A. EDISON.

~~Indn~~

Incandescent Candle

Nov. 6. 1878.

T A Edison

Chas Batchelor

Wm Carman

~~Jas~~ Carman

T A Edison

J Kruesi

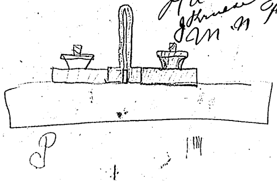
J M Force

480
32.
960
1440
15 3 62
124
20
480

15 362.

32 7 3

450
8.
3.600



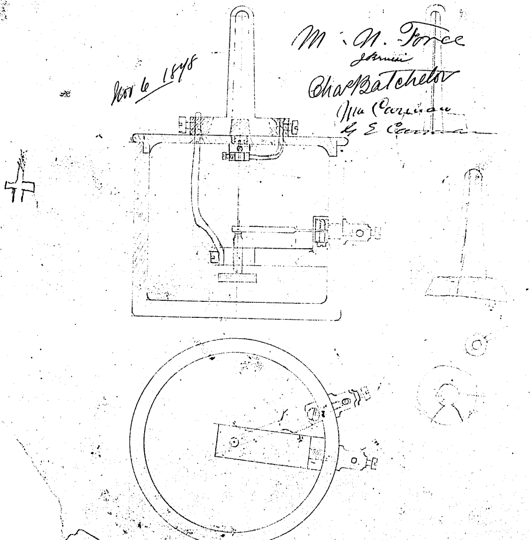
4000

10 oz water

Reg. Apparatus for Electric Light Nov 6th 1878

J Kruesi

T A Edison



M. N. Force

J Kruesi

Chas Batchelor

Wm Carman

G E Carman

Nov 6 1878

212

Nov 6 1878

T A Edison

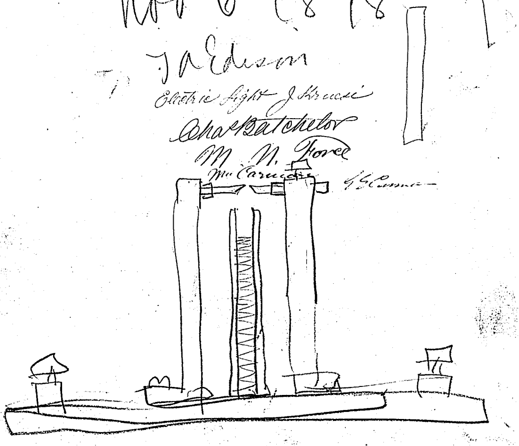
Electric Light J Kruesi

Chas Batchelor

M. N. Force

Wm Carman

G E Carman



Drawn

TA Edison

M. N. Force

Johnson

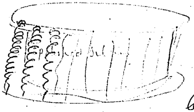
Also the

Wm Carman

Chas Batchelor

Nov 6 1878

G E Carman



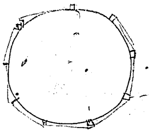
2 inch diameter

slate piece part in

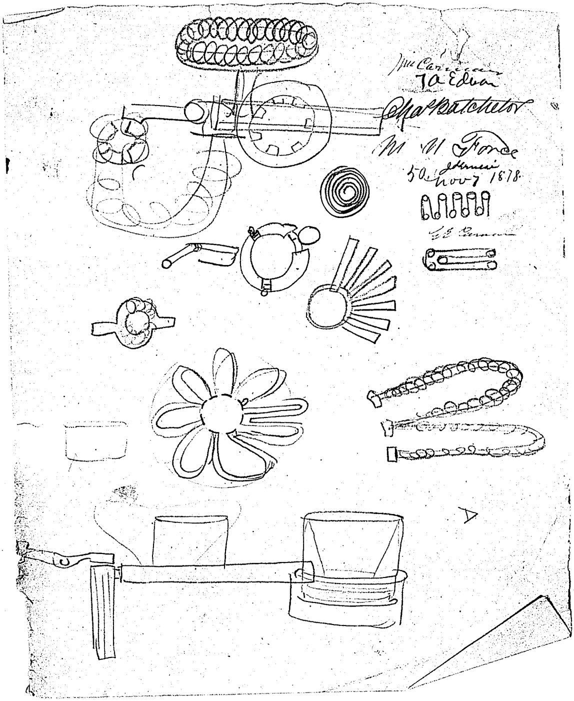
polish silver napkin

ring slate nicked to

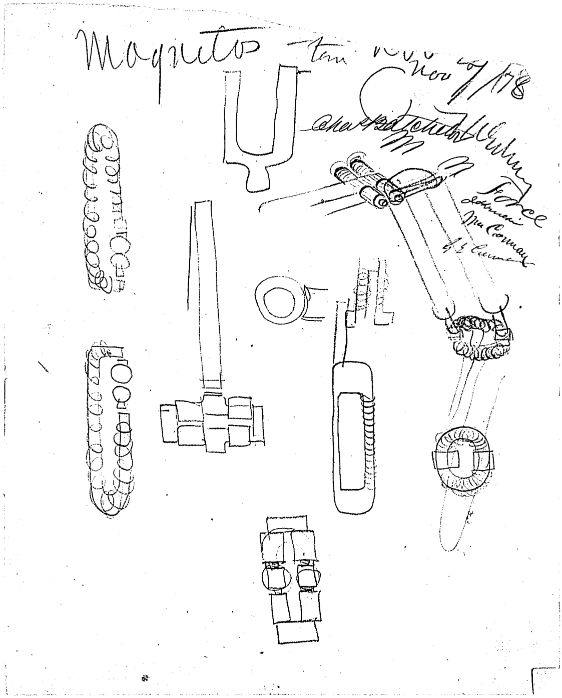
prevent [illegible]



slate

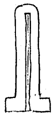


Wm Carman
T A Edison
Chas Batchelor
M N Force
J Kruesi
50 Nov 7 1878
E E Carman


Moquito
tan
Nov 7/78
Force
Johnson
Mc Connay
G. L. Conner

Electric Light Nov 9th 1878

[illegible]



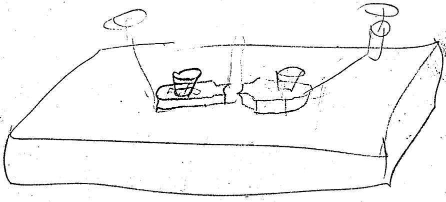
T A Edison

Chas Batchelor

M. N. Force

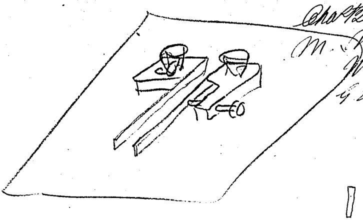
Wm Carman

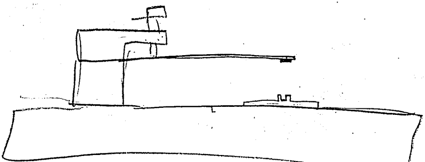
G E Carman



Dean

Electric Light Nov 4th 1878
J Kruesi
T A Edison
Chas Batchelor
M. N. Force
Wm Carman
G E Carman





50
48
47 } all melt, These are manganese ores =
~~48~~ ditto,

82 n.g.
94 n.g
45 n.g
59 n.g
68. niobium Melt
Curious,

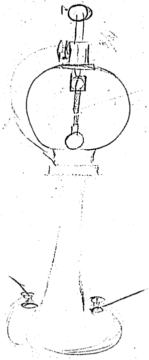
Dean

Nov 8 1878

Chas Batchelor
M N Force
J Kruesi
M. N. Force
Wm Carman
TAE

3/4

Make lamp so:— Nov 9th 1878



carbon sticks 16 thick

½ in

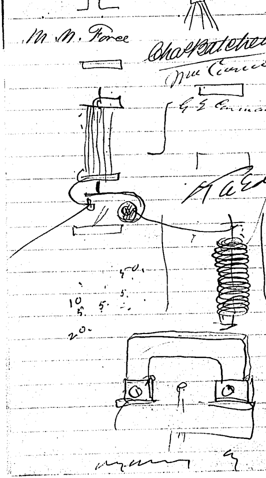
Chas Batchelor
J Kruesi
M. N. Force
Wm Carman
G E Carman

T A Edison

221

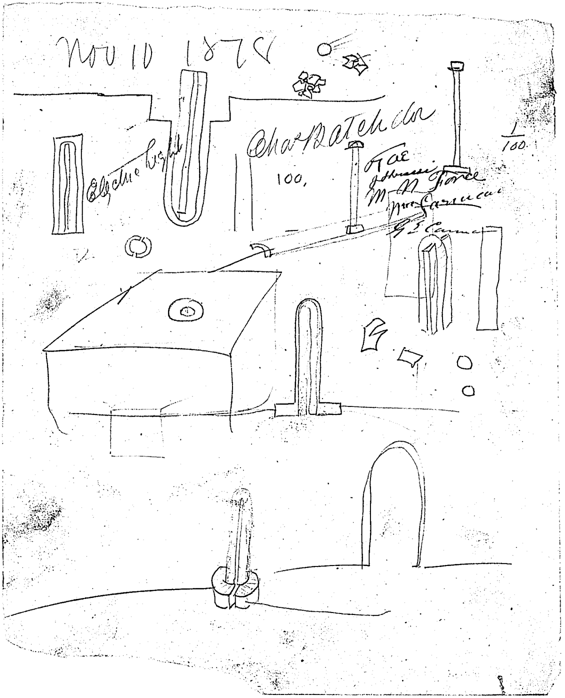
T. A. EDISON.

Menlo Park, N. J., Nov 9th 1878
J Kruesi



M. N. Force
Chas Batchelor
Wm Carman
G E Carman
T A Edison

220


Electric Light
100,
1/100

Nov 10 1878

Chas Batchelor

TAE
J Kruesi
M N Force
Wm Carman
G E Carman

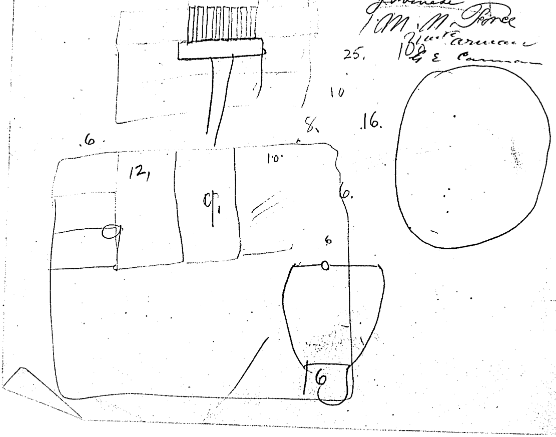
4 wires 100 inches in length for 3 h.p,
if you coil these up in 1/10 dia spirals,
which makes 25 inches of spiral.
if it takes 4 inches to a lamp
it will give 6 1/4 lamps & which, 2 1/8
lamp per h.p.

T A Edison

Electric Light

Nov 10 1878

Chas Batchelor
J Kruesi
M. N. Force
Wm Carman
Geo E Carman



Electric Light
Carbons by Heat & Pressure Nov 10 1878

Chas Batchelor
T A Edison
Johnson

Powdered bituminous coal pressed whilst hot gives good conductor

M N Force
Wm Carman
G E Carman

Powdered bituminous coal & Sugar NG

Lamp black and Sugar first heat & pressure seems to have no conductivity

Afterwards heated in crucible it is a good conductor.

heated again in Carbon dust
Excellent conductor

Powd Bit. coal burnt to Coke - conductor
Saturated with sugar & dried. ~~no better~~ non conduct
Powd. & put in mould with heat — good conductor
Baked with carbon dust excellent & hard

1

2.4

2.4 1 hp

5.8 1/2 "

~~5~~ 11.6 1/4 "

3.4

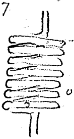
2 1.hp.

51
24
27

4 . 10

0015 2 1/2 long

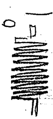
2.7



0015

0

0



1/4

3 1/6

1/2

1/2

1

7

10 2 . 2 1/2

ohm
R

2.04 . 4 cells or 1 h

4.8 ——— 1/2

9.6 ——— 1/4 -

19.2 ——— 1/8

Electric Light
Nov 10 1878
TAE
Chas Batchelor
J Kruesi
M N Force
Jno Carman
G E Carman

225

Electric Light Nov 10 1878

highly
Incandescent

Chas Batchelor

inch of 36 wire per cell. when coiled 1/16 diam

J Kruesi

4 inch makes coil 1/4 long.—

Thos A Edison

M N Force

Wm Carman

2 series of

100 cells 100 inches 25 coils 1/4 long 1/16 diam

G E Carman

~~Series,~~

12 coils 1/2 long
6 Coils 1 inch long

double series 6 coils 2 inches long.

3 lamps,

1 hp 2 3.

2, 3 3

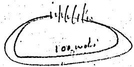
10

1/2 inch 4.

2

100 cells

25 1/2 inch spirals.



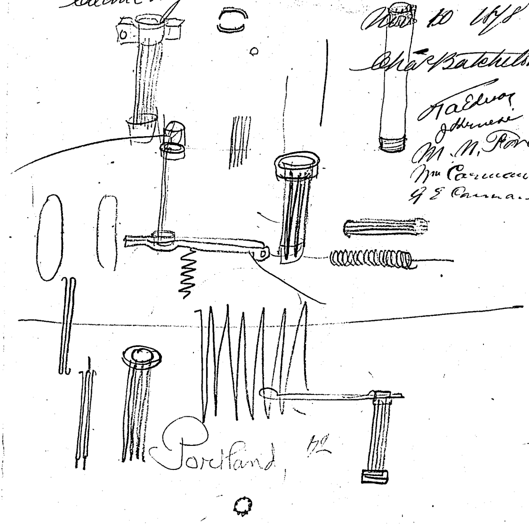
3

Electric Light

Nov 10 1878

Chas Batchelor

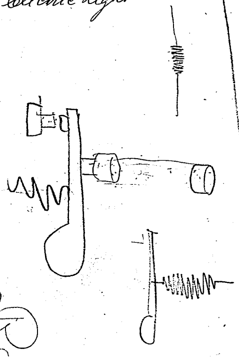
T A Edison
J Kruesi
M. N. Force
Wm Carman
G E Carman

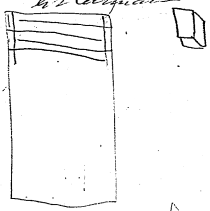


Electric Light

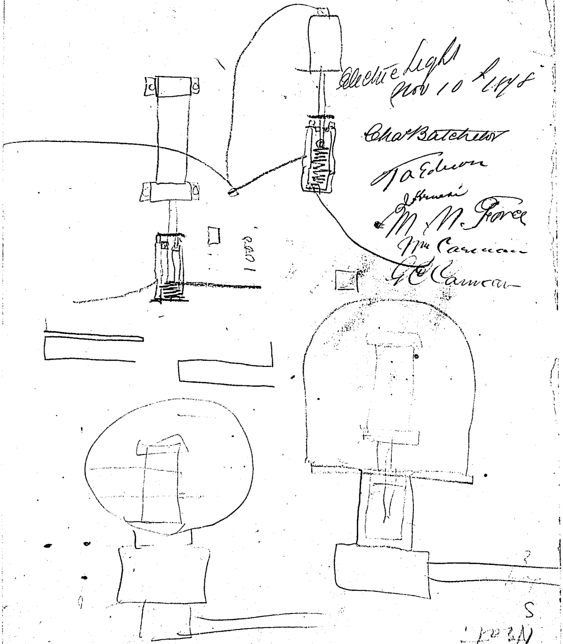
Nov 10 1878

Chas Batchelor
Wm Carman
T A Edison
John Kruesi
M N Force
G E Carman





Portocabo
Portacabello
Royalty
Regal

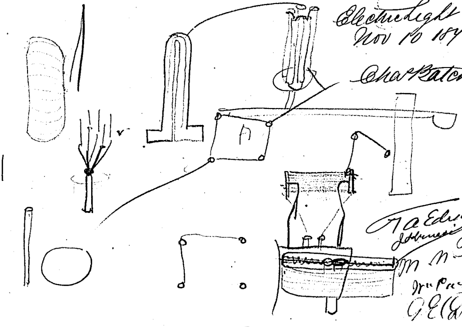


Electric Light
Nov 10 1878

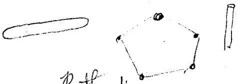
Chas Batchelor
T A Edison
J Kruesi
M N Force
Wm Carman
G E Carman

Electric Light
Nov 10 1878

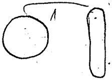
Chas Batchelor

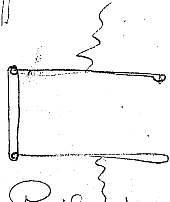


T A Edison
Johnson
M N Force
Jn°
G E Carman



Portland





1 Portland.
Portland

Electric Light Nov 10 1878.

6, wires $\frac{1}{8}$. diameter, add them together as one wire what will be the diameter of the large wire, = 17, of 5/8 of inch.

Chas Batchelor

Thos A Edison

J Kruesi

M. N. Force

Wm. Carman

Geo E Carman

17, $\frac{5}{1000}$ 3

$$\begin{array}{r} 17 \\ 5 \\ \hline 85 \\ 4 \\ \hline \end{array}$$

2 29.0000 $\frac{21}{64}$,

7 29.000 29.000 29.000 2900

29.000, $\begin{array}{r} 8 \\ 4 \\ \hline 32 \\ \hline 16 \end{array}$ $\begin{array}{r} 9 \\ 4 \\ \hline 36 \\ 18. \end{array}$ 21/4.

$$\begin{array}{r} 5 \\ \hline 85 \\ 4 \\ \hline 340 \end{array}$$

27.000,

29.00 2

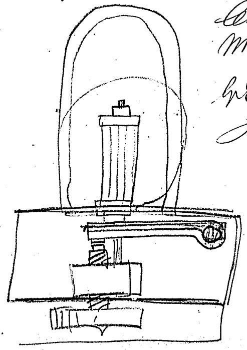
$8\overline{)170}$ 21-2

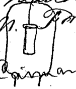
$3\overline{)1001}$ 333333 /

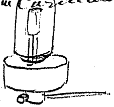
Electric Light

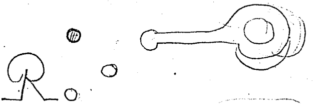
Nov 10 1878

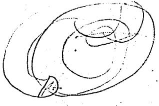
Chas Batchelor
M. N. Force
Geo E Carman
Thos A Edison
J Kruesi
Wm Carman







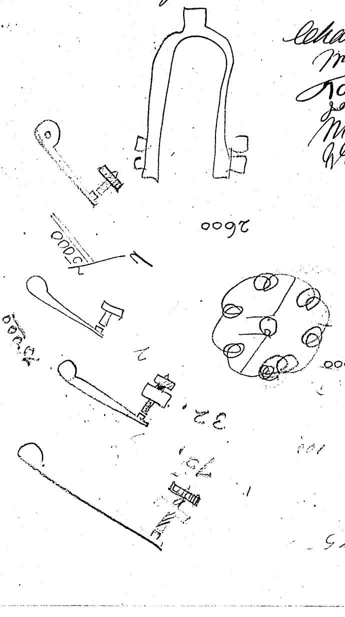




Electric Light

Nov 10 1878

Chas Batchelor
Wm Carman
T A Edison
J Kruesi
M N Force
G E Carman



10000
10000
2600

75
1
1
75
31
50, 100
500,
32,
100
2000
2
500
2
12,
4
16,

Electric Light

Nov 10 1878

Chas Batchelor

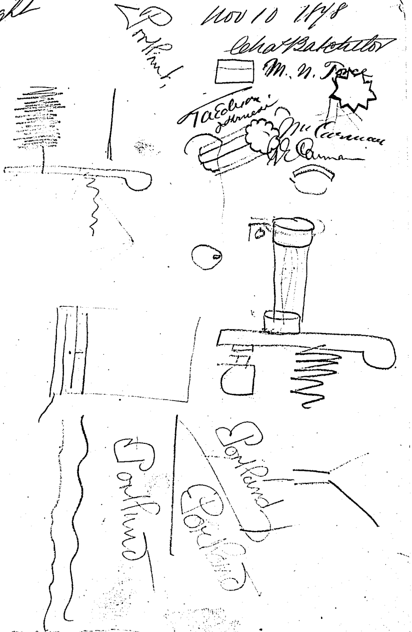
M. N. Force

TA Edison

J Kruesi

Mc Carman

W Carman


Portland.
Portland
Portland
Portland

16. Barito-Calcite. no. 9.

Strontium

17 Coelestine,

T A Edison
John Kruesi
M N Force
Chas Batchelor
Nov 10 1878
Wm Carman
[illegible] Carman

49. Pyrolusite. Black ox Mang

utterly infusible in arc incandesc

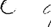
luminously arc 200 per cent

works beautifully by in[illegible]desce

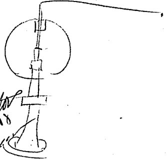
Biggest Strike yet

Some pieces (impure) melt perhaps because silica in it or a metal.

235

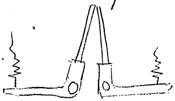
Make Inst
5 platina points  on a
cup holding pencil of Prussia blue

Lamp for same

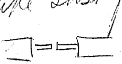


Wm Carman
T A Edison
J Kruesi
M. N. Force
Chas Batchelor
Nov 10 1878
Wm Carman

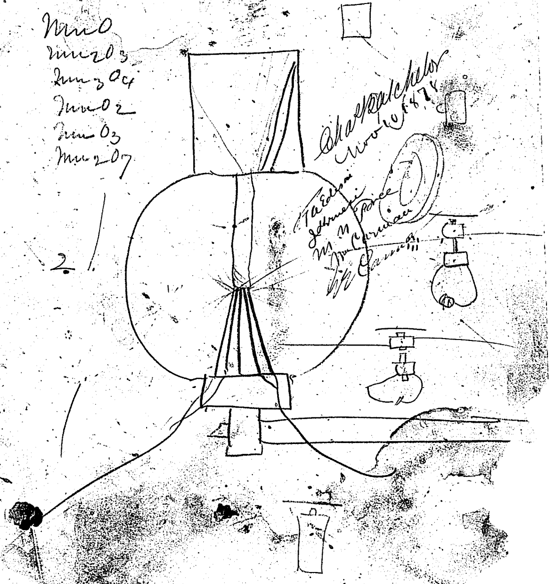
Lamp like this



Make Inst for adjust.



MnO
Mn_2O_3
Mn_3O_4
MnO_2
MnO_3
Mn_2O_7



Chas Batchelor
Nov 10 1878

T A Edison
J Kruesi
M N Force
Wm Carman
G E Carman

Potassium

8. Oligoclase melts into nice white glass
~~shortens no~~

9 Natrolite. NG shortens no

TAE

Lithium John Kruesi Force Chas Batchelor Nov 10 1878. Wm Carman G E Carman

10 Triphylline, Conductor
Not - shortens are greatly

11 Spodumene - non cond. melts fuse
Shortens are =

12 Petrolite NG non cond -

13 Lepidolite non Cond. NG

~~14 Heavy Sp~~

Barium

14 Heavy Spar - Non c

15 Witherite, Conductor when very hot, boils.

No 1 Sylvine K Potassium melts instantly allows arc to be longer —

No 2 Carnallite K. ditto —

No 3 Alunite K. Dont melt So easy

Shortens arc non cond —

No 4 Polyhalite K, melts easy non cond lengthens arc slightly

T A E

M N Force

Chas Batchelor

Nov 10 1878

Wm Carman

G E Carman

~~Sodium~~

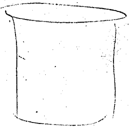
No. 5 Orthoclase (Potassium) ~~Rock Salt~~ fuses to bead that appears permanent — non cond — beads keeps white hot for 20 seconds

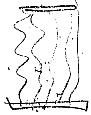
Shortens Arc —

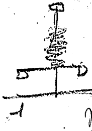
Rocksalt ~~Cryolite~~ Melts instantly

Makes arc very much longer & much whiter

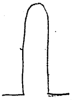
~~Ol~~ Cryolite Shortens arc







Wm Carman
T A Edison
J Kruesi Force
M N
Chas Batchelor
Nov 10 1876
G. E. Carman



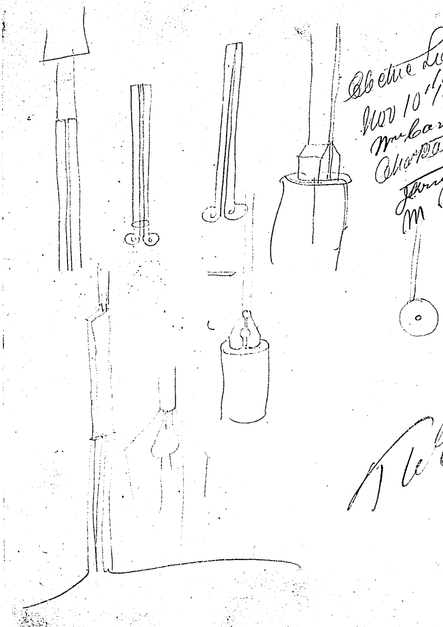
Electric Light Nov 10 1878

99 — N. G. Non Condr —

Chas Batchelor

91 Zincite — after mass is a good Condr but fuses easily. Its magnetic meaning of Iron

T A E J Kruesi
Wm N. Force
Wm Carman
Geo Carman



Electric Light
Nov 10/78
Wm Carman
Chas Batchelor
J Kruesi
M N Force

TAE

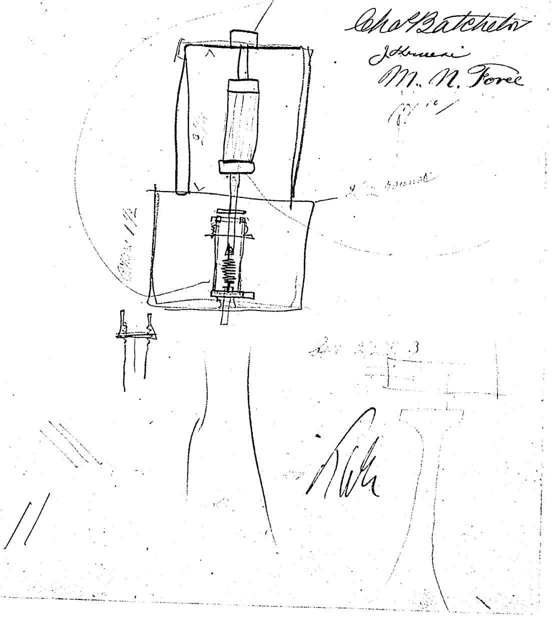
Electric Light

Nov 10 1878

Chas Batchelor

J Kruesi

M. N. Force



TAE

No 49 Electric Light Nov 10 1878

Chas Batchelor

First piece - melts in 10 minutes into a pasty mass

TAE

J Kruesi

Second piece

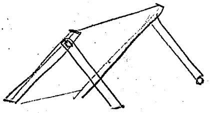
M. N. Force

Impossible to melt

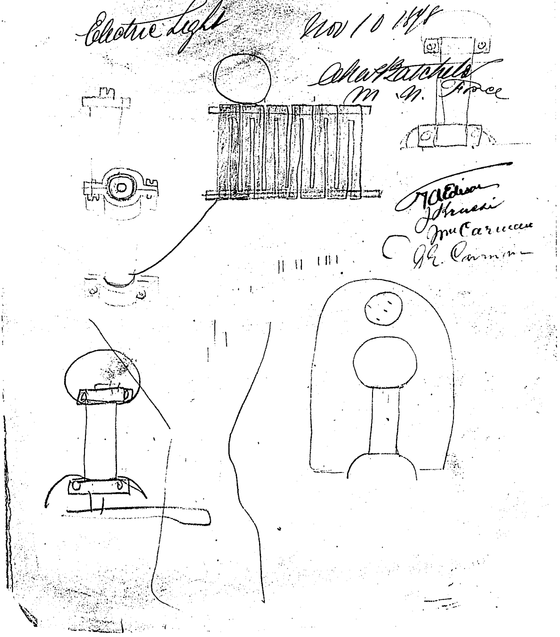
Wm Carman

Third piece - Cannot melt

I notice that it wears entirely away under the arc



Electric Light Nov 10 1878



Chas Batchelor
M. N. Force

T A Edison
J Kruesi
Wm Carman
G E Carman

Electric Light

Nov. 10 1878

Chas Batchelor

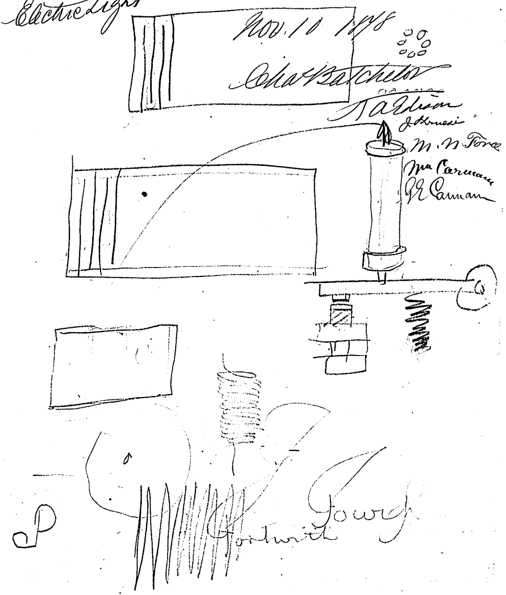
T A Edison

J Kruesi

M. N. Force

Wm Carman

G E Carman



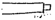
Forthwith

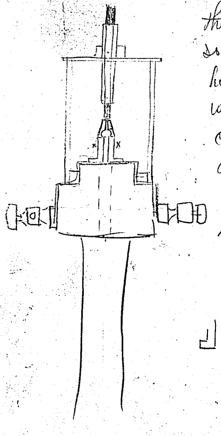
Towd

Nov 11th 1876

Wm Carman
J Kruesi
Chas Batchelor
M. N. Force

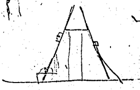
Mr Kruesi

Make an instrument like this. XX are two pieces platina made in shape of a hollow cone. the carbon has a little tit on it so  which lays in the hole in platina and the rod is pressed down on platina; as carbon burns away the cones drop through.



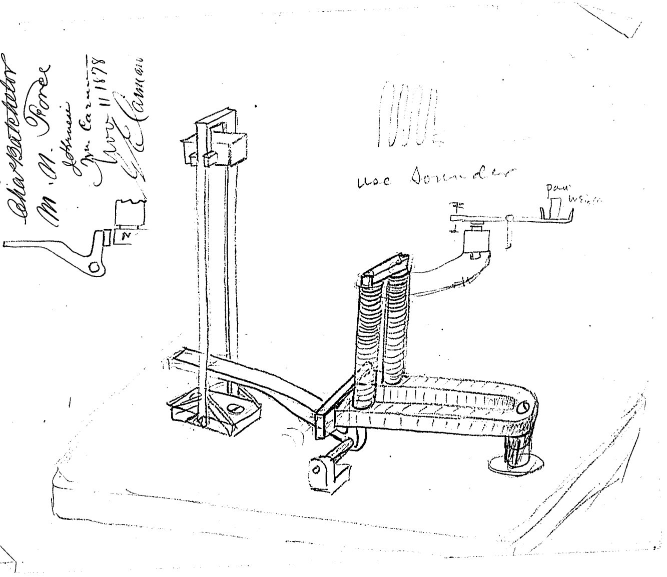
Make more bevel to the platina than is shown in sketch

TAE



TA Edison
~~Chas Batchelor~~
M. N. Force
J Kruesi
Jn. Carman
Nov 11 1878
G E Carman

10902


use sounder
pan weight
N

Burner model for electric light

[illegible] 14th 1878

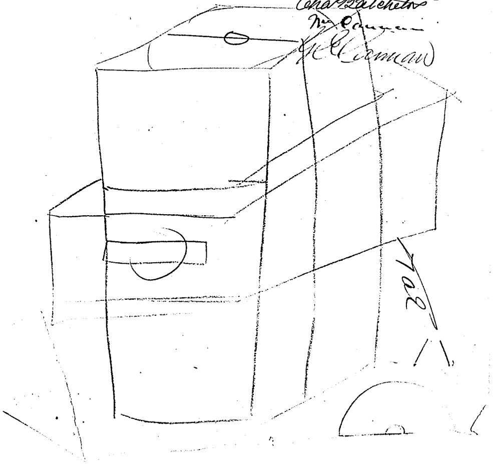
[illegible]

M. N. Force

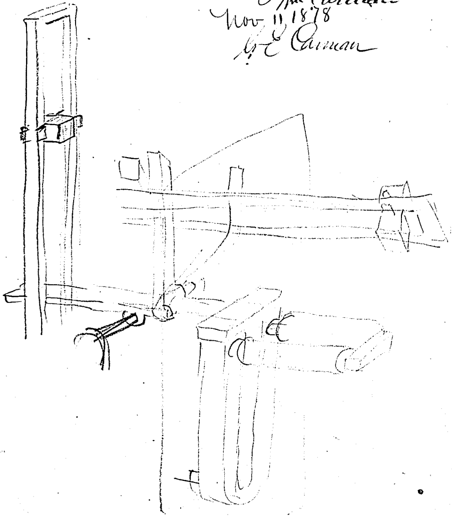
Chas Batchelor

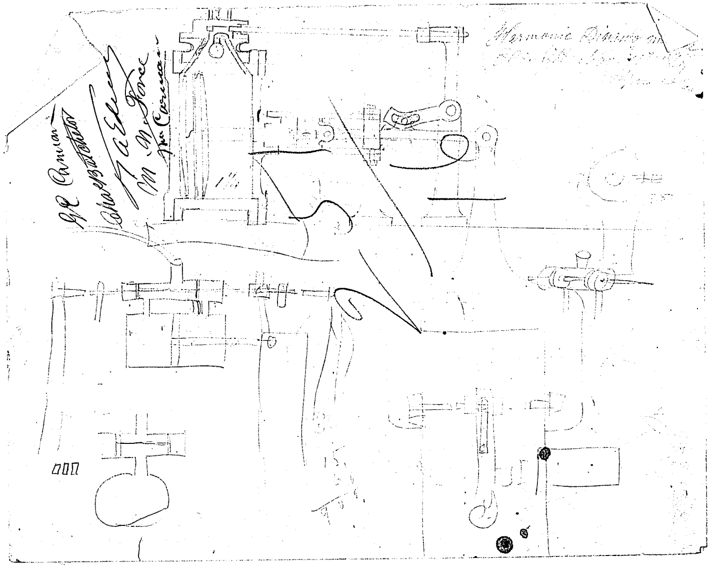
Wm Carman

G E Carman



TA Edison
Chas Batchelor
M. N. Force
J Kruesi
Wm Carman
Nov 11 1878
G. E. Carman

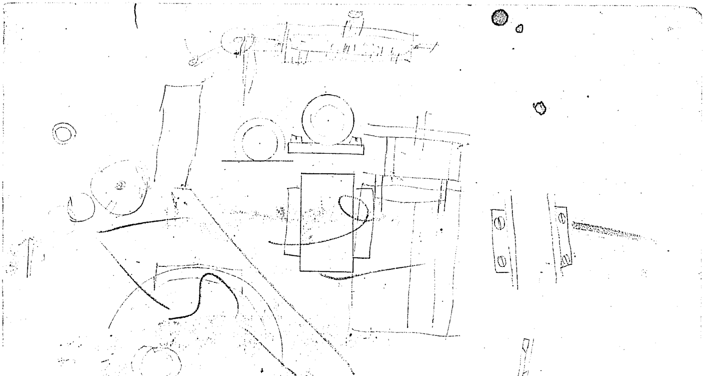




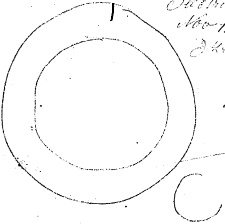
G R Carman
Charles Batchelor
J A Ely
M N Force
Jno Carman

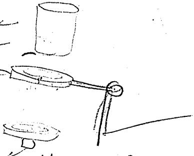
Harmonic Driving on [illegible]

251



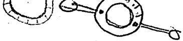
Electric Light
Nov 11th 1878
J Kruesi



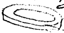


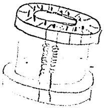
1/2 inch

1/2 wide, Ring $\frac{3}{32}$ thick

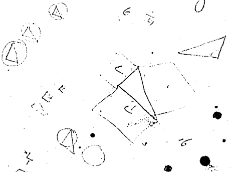


TAE
M N Force
~~Chas Batchelor~~
Wm Carman
S L Griffin





1/32
of cylinder



1500
1356

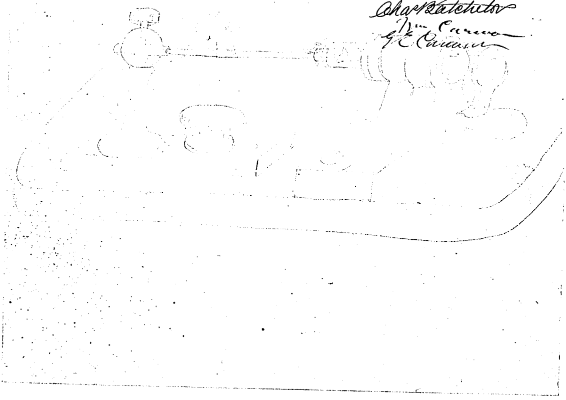
1.025

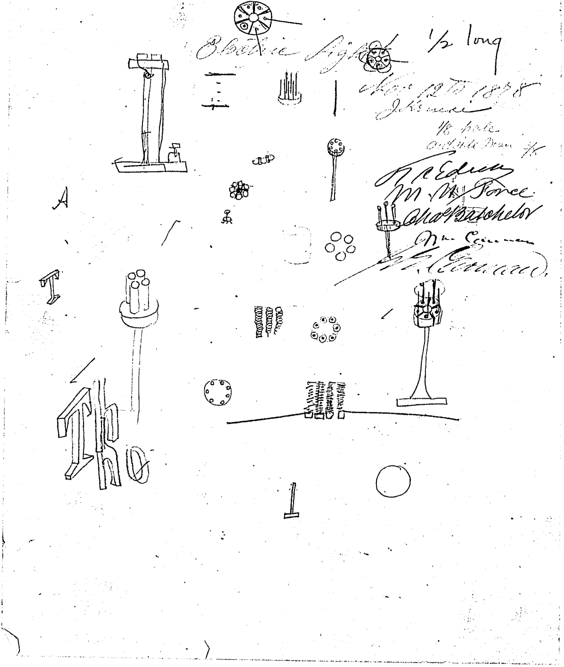
1875

$\sqrt{3^2+3^2} = 4\frac{1}{4}$

Aparats. for winding spirals f. Electric Lght
Nov 11th 1878
J Kruesi

T A Edison
M. N. Force
Chas Batchelor
Wm Carman
Geo E Carman





Electric Light

1/2 long

Nov 12th 1878
J Kruesi

1/8 hole
outside Diam 3/8

T A Edison
M N Force
Chas Batchelor
Wm Carman

J H Knight Nov 13 78

Resis Condr to Generators

Karite $\frac{5}{10}$ Ohms

Copper $\frac{2}{10}$ Ohms

Chas Batchelor

T A Edison

J Kruesi

M. N. Force

Wm Carman

G E Carman

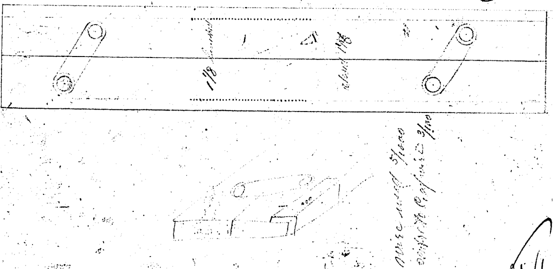
Electric Light Nov 13th 1878

[illegible]

Chas Batchelor

M. N. Force

McC


1/8
about 1 1/8
wire small 5/1000
outside platina 3/100

TAE

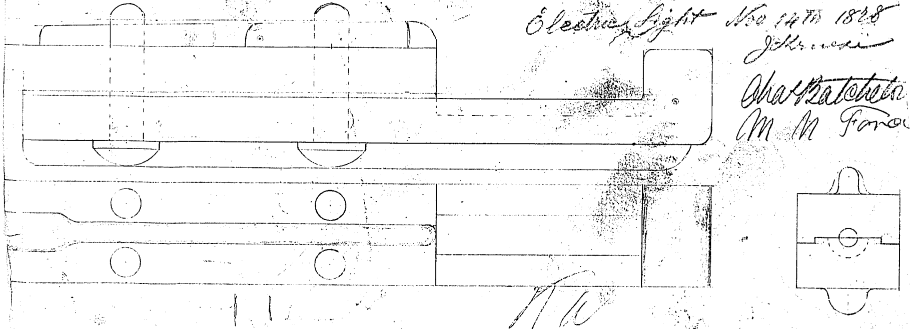
Electric Light
Carbons by pressure

Nov 13th 1878
Chas Batchelor
TAE
M. N. Force

Anthracite coal has 90 per cent Carbon
try it for moulding

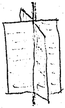
Wm Carman
J Kruesi

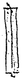
Electric Light Nov 14th 1878
J Kruesi
Chas Batchelor
M N Force



TAE
Wm Carman

Electric Light Nov 15 1878





Chas Batchelor

M. N. Force TAE

Wm Carman

J Kruesi

5000

1

5

1.7.350

8

5/16

16

Weston Machine — Tests

Electric Light Nov 15 78

K Knight — Nov 15 78

Discription Wire	Size	Length inches	Shape	Time to come to Red heat	Remarks.
Iron	23	2 in	2 Strand	$\frac{1}{8}$ Sec	Resis
"	23	1 "	4 "	Immy	"
"	23	1 "	Straight Single	Immy	" TAE × (good)
"	23	2 "	Single Coiled	$\frac{1}{4}$ Sec	"
"	14	3 "	Strait single	$1\frac{1}{8}$ Sec	"
"	14	3 "	Coiled	$\frac{1}{4}$ Sec	"
"					
Copper	20	2 "	Single Coiled	1 Sec	Resis $\frac{2}{2000}$
"	20	5 "	" Strait	$\frac{1}{4}$ "	" $\frac{5}{2000}$ ohm
"	20	5 "	" Coiled	Immy	" $\frac{5}{2000}$ " × (good)
"	23	10 "	Double Coiled	Immy	" $\frac{3}{500}$ "

Chas Batchelor

M N Force

Wm Carman

J Kruesi

A wire of $\frac{1}{100}$ diam and 1 ft long has
surface $\frac{3}{100} \times \frac{1200}{100} = \frac{36.00}{100}$
$.03 \times 12.00 = .36$ area exposed

Wound in form of spiral

The spiral must be wound to get the proper effect in the ratio of 67 inside surface to 27 outside
The basis of this calculation was made from a wire 1 foot long $\frac{1}{100}$ inch diameter

Electric Light

Nov 15 1878

TAE

Chas Batchelor

M. N. Force

Wm Carman

J Kruesi

E Light Nov 25

Spiral wire 1 ft long with 100 units heat

Concentrate

$\frac{1}{4}$ $\frac{1}{8}$ · 25 lin $\frac{1}{8}$ long   25 X 36

$\frac{3}{8}$ X $\frac{1}{4}$

$\frac{3}{}$

Spiral $\overset{\text{long}}{\frac{1}{4}}$ X $\frac{1}{8}$ = $\frac{1}{100}$ wire = 9 $\frac{3}{8}$ inch ~~surface~~ long

$8 \overline{)75}$
$9\frac{3}{8}$

~~$\frac{1}{4}$ X~~ $\frac{1}{4}$ X $\frac{5}{32}$

25 X

Spiral $\frac{1}{4}$ X $\frac{5}{32}$ = 12 in coil

Chas Batchelor

TAE

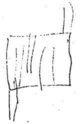
5 : 3 : 50 : 30 100 : 60 :: 25 30

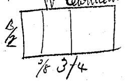
100 : 60 :

$8 \overline{)100}$
$12\frac{1}{2}$

62
37
99

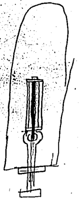
M N Force

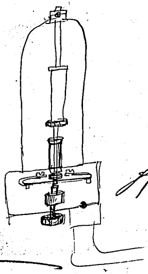




Electric Light Nov 15 1878

16





TAE

Chas Batchelor

M N Force

Wm Carman

J Kruesi

Electric Light Nov 5 1878

2000 ft 7" 6000 ft per hour

6000 7 3/4 1000 ft

3 the length
6 times less

Wm Carman
Chas Batchelor
M N Force
J F Kruesi

8000 3 16/100 1000 ft 9.21 = 8 1/3

7.068

$$\begin{array}{r} 8.0424 \\ 6 \\ \hline 48.2544 \end{array}$$

TAE

$$\begin{array}{r} 9.21 \\ 7.75 \\ \hline 1.46 \end{array}$$

9.21 = 66.48

6

$$\begin{array}{r} 8)\,66.48 \\ \hline 8.3 \end{array}$$

~~75~~ ~~9.21~~

30.000 - 22 ft 1/2 6" per hour

852 4 six miles per hr

$$\begin{array}{r} 5280 \\ 6 \\ \hline 31680 \end{array}$$

Cubic feet
28·2.
3·0000 through 6" pipe 22½ ft per hour
852 through 4" pipe 31·680
12·5

30 000 pass throug Area 28·2 - 22½ ft per hour
852 " " 12·5 = 31·680 ft per hour

2550

~~8~~ 12

TAE

4 0
4 0
1

2)25010~~00~~
1 2 5 0
3 1 3
1 5 6 3

5)9000
1800

2)2240
1120
4480

Electric Light Nov 15, 1878

Chas Batchelor
M N Force
Wm Carman J Kruesi

Electric Light
Nov 16. 1878 28.

100 = 1
200 - 4
300 - 9
400 16

Chas Batchelor
TAE
M N Force
Wm Carman
J Kruesi

.02 Candle for 100 cells
.08 100 cells
.18 100
.32 400
1.28 800
5.12 16.
20.48 32
12.50 25
15.68. 28

16
16
96
16
256
2
512

32
32
64
96
1024
2
20.48

25
25
125
50
625
2
12.50

28
28
224
56
784
2
15.68

Electric Light Nov 16. 1878

Suppose wire 1/100 long 100 at temp 100° Fah + radiates 100° every second every inch

1200 degrees radiates every second

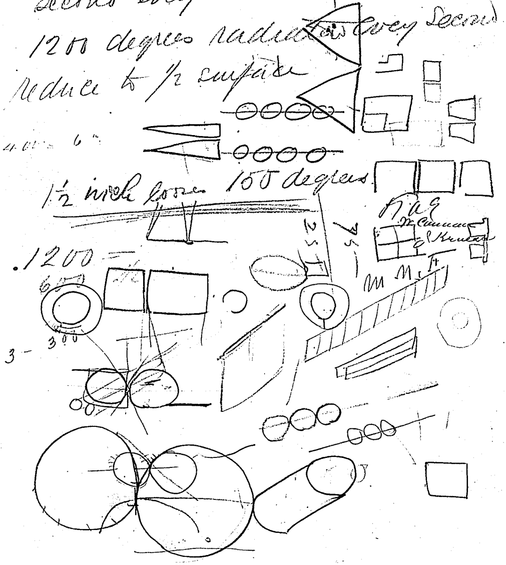
reduce to 1/2 surface

4.00 = 6"

405

1 1/2 inch loose 150 degrees

.1200 =



125
75
NAG
McCumm
Kruesi
M M
600
300
3 –

Electric

28 horsepower 40 lights of 1 gas jet each

or

28/100 | 3.6
84
160

140
3½
0
0
140

Our Lamps 140 then are equal to

140 gas jets to 100 horse power

Cost $8 per day

Cost each about 5.70 per day or

$21 per year

140/8.000 | 0.057
700
1000

140
840

.057
140
.0228
.057
.05980

TAE

Electric Light

Nov 16th 1878

Chas Batchelor

M N Force

Wm Carman

J Kruesi

Electric Light
Nov 16. 1878

.12 inch

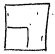
3 miles 400 =

$\frac{3}{4}$ = 1600

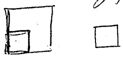
3 1248

.75
.75
375
525
.5625

12 = 16
16
96
16
256 00



$\frac{3}{4}$ 1600



4 =
1200 = 12 3/4
1600 =
100 = 1 m

16
16
96
16
25600
1

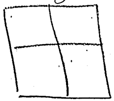
125
16
750
125
2000

1600

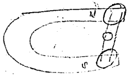
Chas Batchelor

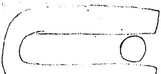
Mr ½ Force

Wm Carman
J Kruesi



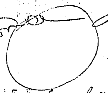
Electric Light
Nov 16 1878



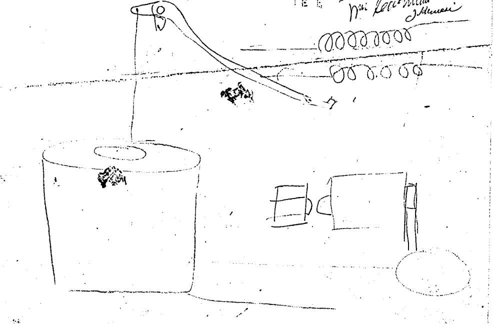


Chas Batchelor

TAE



Wm Carman
J Kruesi



3

1¼

40,
80

12. 16. L
32 2
48, 3,

4

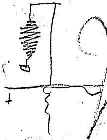
50

2

~~002~~ 020
002

0

100.



8.

5 Lamps 8 Candles 26

7 burners.

~~25 cents hour~~
~~250 per factory~~

50c

7c

21
10,50

40 inches
160 inches ¼ current. 35
4

5 ohms

7 burners

100 ohms
200. 40 lamps
400 ~~20~~
800
1600. 10

100 ohms

40,

100. ohms

40,

40

4 4.

270

Electric Light

Edisons Dynamo electric machine

Dec 12th 1878

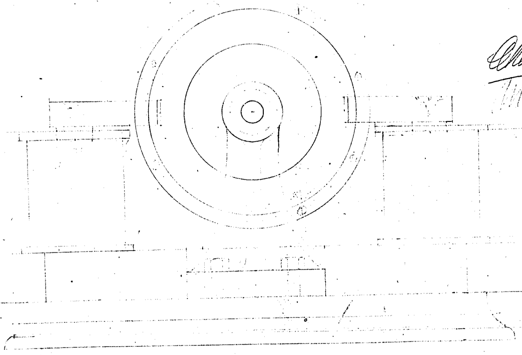
J Kruesi

902

Chas Batchelor

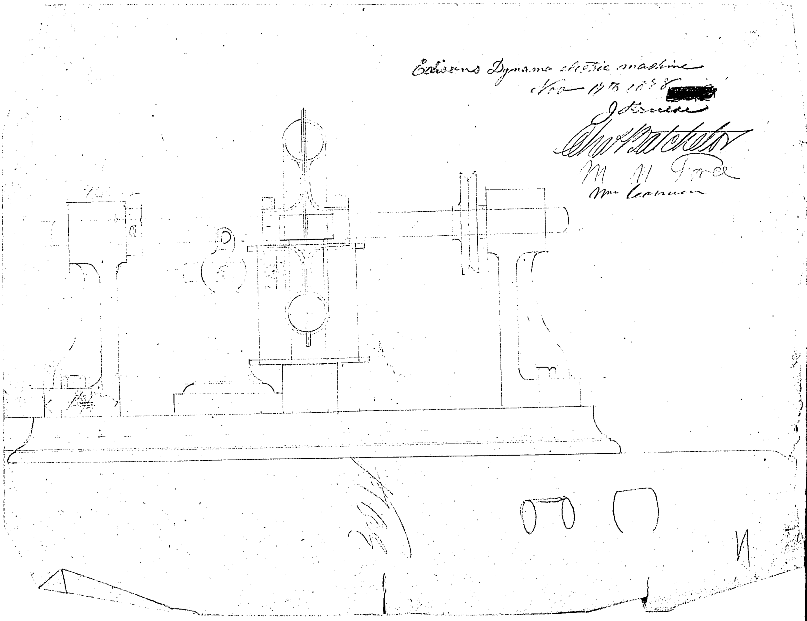
Jm M Ford

Wm Carman



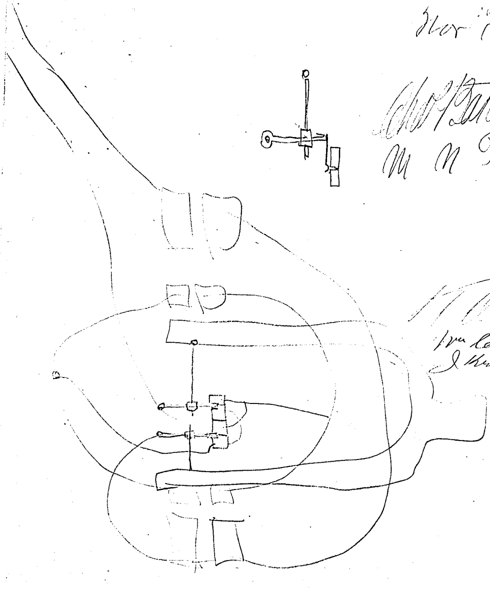
TAE

271



Edisons Dynamo electric machine
Nov 17th 1878 [redacted]
J Kruesi
Chas Batchelor
M N Force
Wm Carman

Electric Light
Nov 18, 1878.

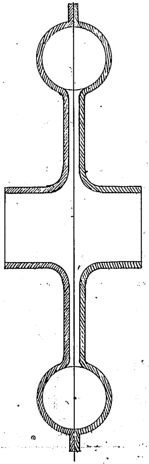


Chas Batchelor
M N Force

T A E

Wm Carman
J Kruesi

Electric Lig



Nov. 19th 1878

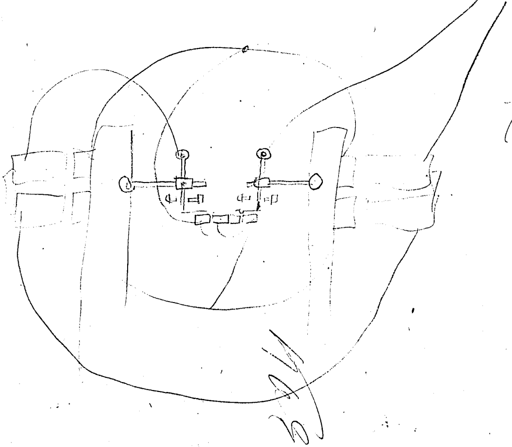
Copper No 15 wire gauge American gauge

FROM THE LABORATORY OF
T. A. EDISON.
MENLO PARK, N. J.
U. S. A.

Chas Batchelor
M N Force
Wm Carman
J Kruesi

31 ½
62 | 62
186.5 | 3.0

Harmonic Dynamo machine



Nov 19th 1878

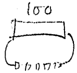
J Kruesi

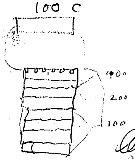
Chas Batchelor

M N Force

Wm Carman

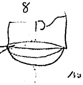
Electric Light
Nov 20, 1878




100 C
400
200
100

25. 1200

25



Chas Batchelor
M N Force
J Kruesi

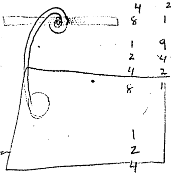
1000 2
4
500 8
250
125 : 10 ~~100~~
500

1000

500

135. 250
125

TAE
Wm Carman



1	1000
2	500
4	250
8	125
1	900
2	450
4	225
8	112
1	800
2	400
4	200
8	100

Electric Light Nov 20, 1878

2

6 ~~3/16 1/2~~

Chas Batchelor

2

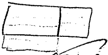
M Force

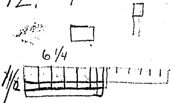
1/16. 3/16. 6/16.

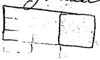
12.

3000,

120







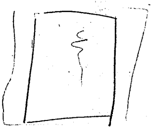
J. Kruesi

100 3/32
50 6/32
25 12/32
12 1/2 ~~24/32~~ 3/4

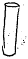
9 inch

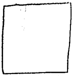
2

900

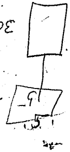


3.





300



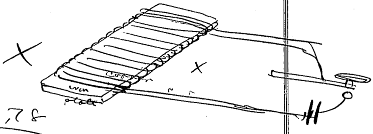
1 2 40,00,

16000, ,100

3/4 6400 160

3/32 2

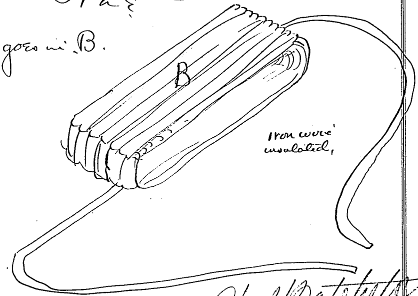
3


X
copper
wire
plate
X
H

Nov 20 78

TAE

X goes in B.

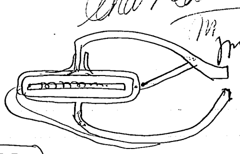

B
Iron wire insulated,

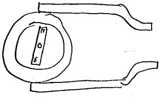
Chas Batchelor

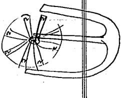
M N Force

Wm Carman

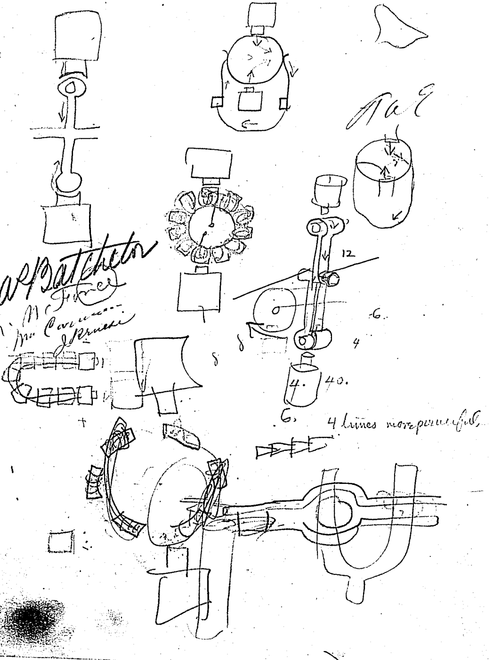
J Kruesi







Electric Light Nov 20.1878


TAE
12
6.
4
8
8
4.
40.
6.
+

Chas Batchelor
M N Force
Jno Carman
J Kruesi

4 lines more powerful

Electric Light Nov 20 1878

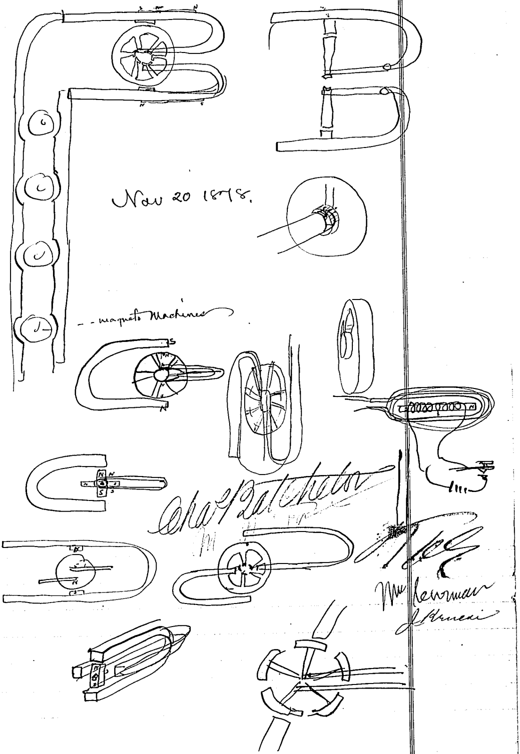
[illegible] resistance of substances by [illegible] Martin N. Force

peroxide of iron pure: by pressure
M. F.

peroxide of iron & plumbago equal by weight. M-F. equal by quantity. M.F.

Caustic	1	part
Rutile	"	part
Peroxide iron	"	

TAE
Wm Carman
J Kruesi


S
N
N
S
N
S
N
S
N
S
N
S
S
N
N
S

Nov 20 1878.

--magneto Machines

Chas Batchelor

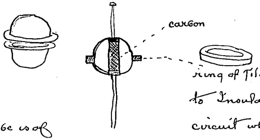
Wm Newman

J Kruesi

Electric Light

Nov 20 1878

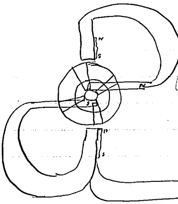
T A Edison



ring of Titanic oxide (rutile) to Insulate and short circuit when hot by becoming a Conductor

The globe is of Platinum - becoming incandescent by radiation & Conduction - Oxygen is prevented from access to Carbon.

I propose to make a machine that will generate Large quantities of Magnetism by power as the present dynamo Machine generates Electricity & use the magnetism for field magnets for a number of Magneto Electric Machines.



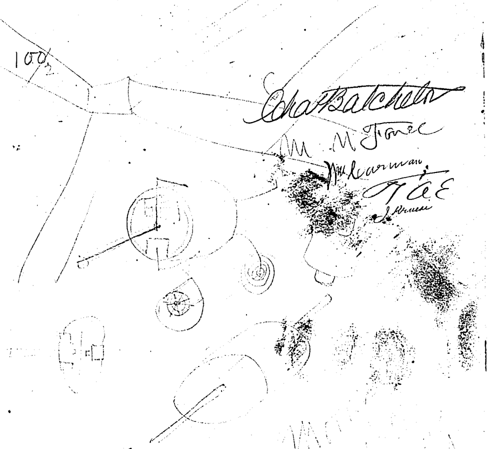
Chas Batchelor

M N Force

Wm Carman

J Kruesi

Electric Light Nov 21 1878



Chas Batchelor
M. N. Force
Wm Carman
T A E
J Kruesi

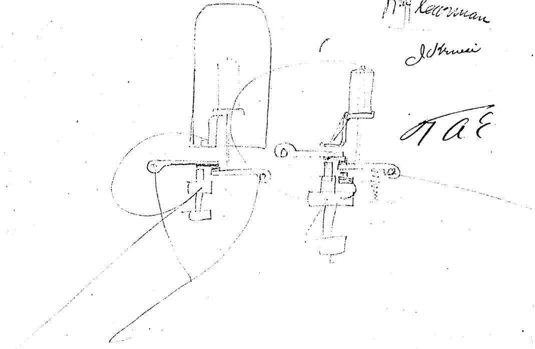
Nov 21 1878

Electric Light
Nov 21.1878

T A E

Chas Batchelor
M. N. Force
Wm Carman
J Kruesi

T A E



Electric Light Nov 22. 1878

Cubic foot mixed 94 hours 4 cells

Carbon. 6 inch surface,

TAE

12 inch 47

24 23½

48 .12

96 .6.

144

44 hours

Chas Batchelor

M N Force

Wm Carman

10, J Kruesi

3/1000

1600

1728,

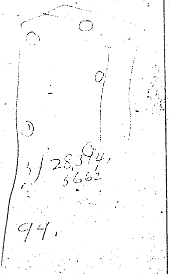
3

5184

12 ufs

1600

3/10,



3/28394,

5662

94,

144

6

864

1728

3

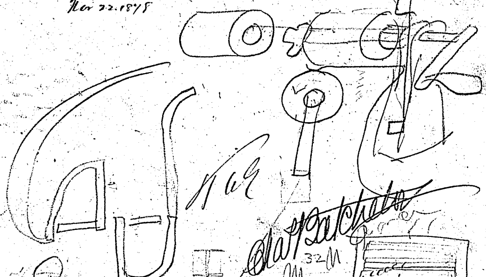
5184.

864

21

3/2,

Electric Light
Nov 22.1878



Na E

~~Chas Batchelor~~

32 M

M

Mr Carpenter

3 J Kruesi

Portland

Portland Portland

Portland 10.00
3.0.0
2.50

4 7600

76000

Kenny

4

Portland Portland

62 1/2

31 1/4

15 1/2

16

32

64

Portland

7000

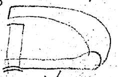
6

7600

76000

7600

7600



2

3

$1000 — Portland

560000000

5600 —

Kenny

Kenny

Kenny

Port 3 Kenny

286

Electric Light
Nov 23 1878

1" .7854 / 19.6350 2
17088

.7854 / 19.6350 24
15708
390306

34 32
34 / 13.00 0.4
1

32 / 25.00 5.8
216
324
4

.7854
2
15708
12
18.8496

7.0686 / 19.6350
141372

64 / 25.1000 0.4
256

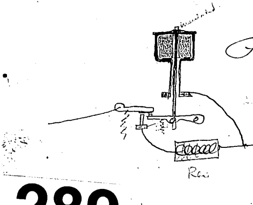
TAE
5

~~Chas Batchelor~~
M. Force
Wm Carman
J Kruesi

(4)

Nov 23. 1878.

Electric Light
Model



T.A.E.

This lamp to go in Kruzi Model given to Griffin esq

Chas Batchelor
M N Force
Wm Carman
J Kruesi

289

Electric Light Nov 23.1878

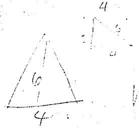
6 X 4 ÷ 2 = 24 ÷ 2 =

12 X 2 ÷ 4 = 24 ÷ 4 = 6

T.A.E.

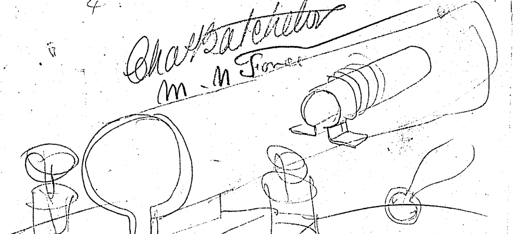
Sum = 12 ÷ 2 = 6
6 − 4 = 2
6 − 4 = 2
6 − 2 = 4

$\sqrt{6 \times 0 \times 2 \times 4} = \sqrt{48} = 7$

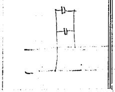


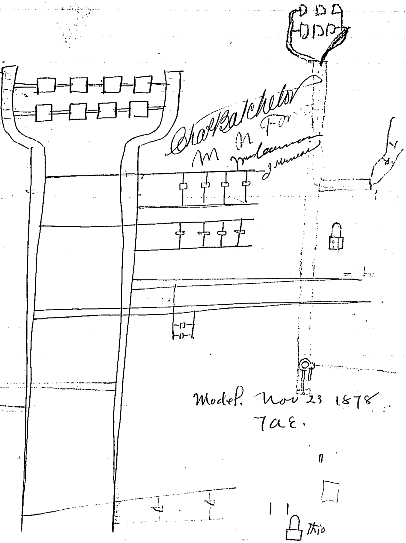
Wm Carman
J Kruesi

Chas Batchelor
M N Force



288





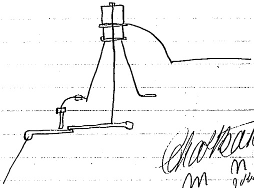
Chas Batchelor
M N Force
Jno Kruesi
J Kruesi

Model. Nov 23 1878.
TAE.

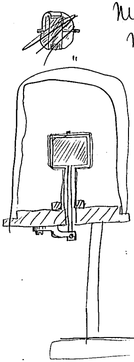
Kruesi. I will give you another Lamp to show on this model.

T. A. EDISON.

Menlo Park, N. J., ______ 187



Chas Batchelor
M N Force
J Kruesi



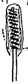
Model for patent office,
Nov 23rd 1878

TAE

Chas Batchelor

Wm Carman

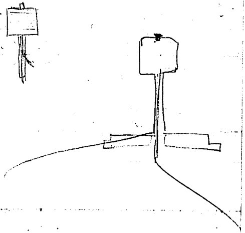
M N Force



in patent,

J Kruesi

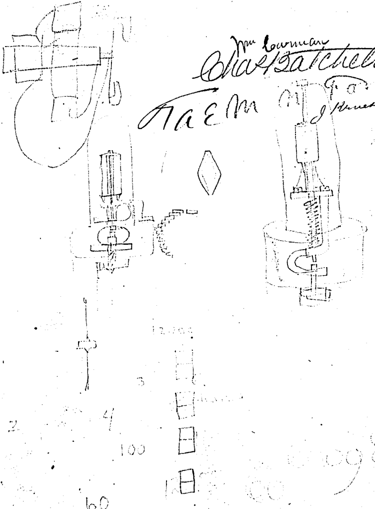
Noose tree
T Edison



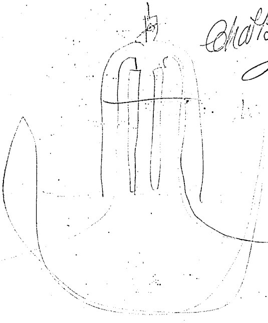
2/606

Electric Light
Nov 23, 1878

Wm Carman
Chas Batchelor
TAE
J Kruesi

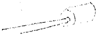

12,000
4
3
2
4
100
60
1.0
16

Electric Light Nov 23. 1878



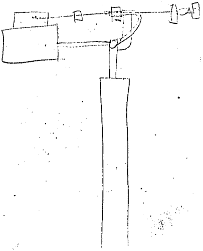
Chas Batchelor
T A E
Wm Carman
J Kruesi

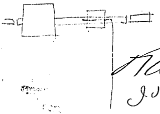
Electric Light Nov 23 1878



Chas Batchelor

Wm Carman





TAE

J Kruesi

Carbons for Electric Light

Electric Light Nov 23. 1878

Make a mixture of

15 parts of powd. bit. coal }
5 " " Sugar

15 parts of powd bit coal }
10 " " Sugar.

15 parts of powd. bit. coal }
2½ " " Sugar

TAE

15 parts of powd bit coal }
1 part of Sugar

In making these powder up the sugar very fine. dont use the sugar solution

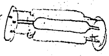
Chas Batchelor
M N Force
Wm Carman
J Kruesi

Electric Light Nov 23.1878

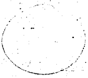
T A E
Wm Carman
J Kruesi

2 = $\frac{900}{3600}$

Chas Batchelor
M N Force

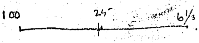


3



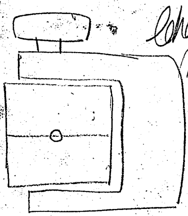
$\frac{1}{8}$

3/



3 = 10 = Electric Light 46.
Nov 23 1878

1 = 1/4 1 2 4
4



Chas Batchelor
M N Force
Wm Carman

·61685316

1.2
1.2
1.44

1.73
1.73
519
1211
173
2.9929

J Kruesi

$$2 = \sqrt{.7854^2 + .7854^2} = \sqrt{.6168 + .6168} = \sqrt{1.33} = 1.2$$

$$4 = \sqrt{1.2^2 + 1.2^2} = \sqrt{1.44 + 1.44} = \sqrt{2.88} = 1.73$$

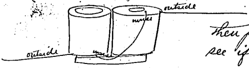
$$6 = \sqrt{1.73^2 + 1.2^2} = \sqrt{3. \quad 1.44} = \sqrt{4.44} = 2.13$$

6168
6168
12336

Electric Light Nov 23, 1878

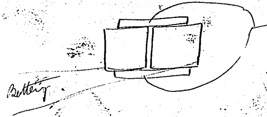
George:—

Take two magnet spools and connect them on cores so that they will have no magnetism opposed to each other so:— I think


outside
inside
outside
inside

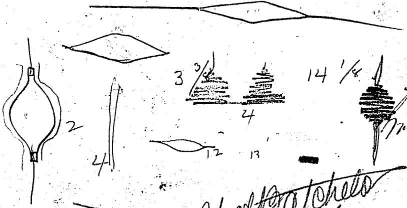
T A E

then put a Keeper on top and see if you can get any magnetism across the middle of the Keepers so:—



Chas Batchelor
M N Force
Wm Carman
J Kruesi

Electric Light Nov 23. 1878

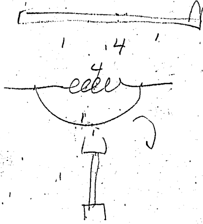

2
4
3 3/8
4
14 1/8
12
13

McCormac

~~Chas Batchelor~~

M N Force

J Kruesi



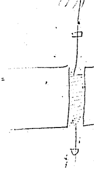
4) 30 (.045
28
20

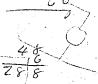
5) 40 (.8
40

Nov. 25th 1828

Electric Light

J Kruesi
John Ott
M N Force
Chas Batchelor
M. N. Force
NC





4'8'0
6'0
0

48
6
288

480
288
192

480
120
360

Diam 1 60/95

48
48
125

TAE

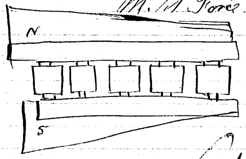
301

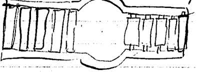
T. A. EDISON.

Menlo Park, N. J., 187

Electric Light Nov. 27 1878

Wm Carman
J Kruesi
Chas Batchelor
M. N. Force



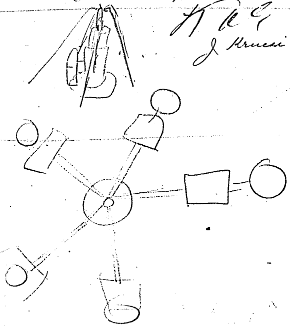


TAE

302

Electric Light Nov. 30th 1878

J Kruesi



Chas Batchelor

M N Force

Wm Carman

J Kruesi

303

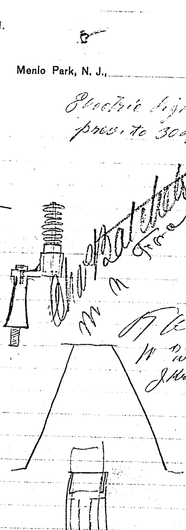
T. A. EDISON.

Menlo Park, N. J., ________ 187

Electric light

pres. to 30 of Nov,

1878



Chas Batchelor

M N Force

W Carman

J Kruesi

304

Electric Light

Nov 30. 1879

1/4 , 2000 125.

,250

32. 1/2 ,30.

1

1/4 . 2000

1/2 . 1000

1 500

2 250

4 125

8 62

16 31

32.

1/4 2000

1/2 500

1 ,125

2 31

4 15 ,8

1/4 2000

1 ,500

2 ,125

4 ,31.

3000

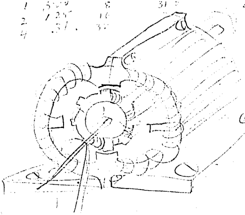
1/2 1500

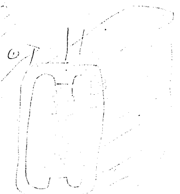
1 750

2 325

4 162

8 81





16 – 40

32 , 20

32

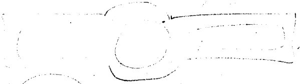
Wm Carman

Chas Batchelor

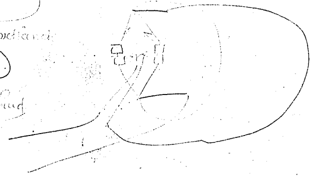
M N Force

J Kruesi

Railway



Portland

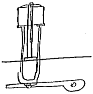


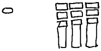
Railway

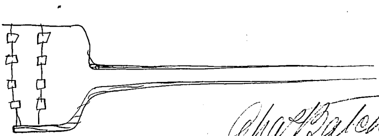
Portland

Railway

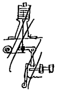
Dec 3/1878

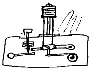






Chas Batchelor

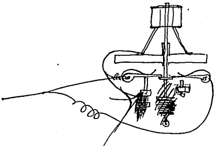




M N Force

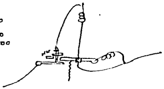
Wm Carman

J Kruesi



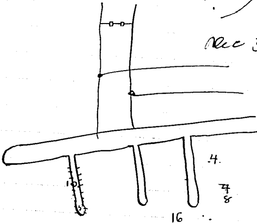
12) 6000 (500.
60
00

1/2
2000
8000
~~2~~ 2 82000



1x2
189
4
756.
4
3024
4
12096.

Dec 3 78



12000
20
240000
2400

144000
2
288000
72000
3.60000

200.
6
1200

4.

2 inch.

4 8   4   12   2 inch wire,

16

	ohm
1	500
2	250
4	125
8	62 1/2
16	31 1/4
32	15 5/8
64	7 13/16
128	3 7/8
256	

128
10
1280.
4
5120.

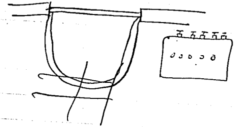
2 inch wire.

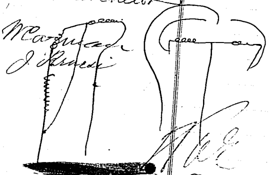
8 inch.

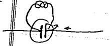
Chas Batchelor

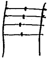
M Carman

J Kruesi







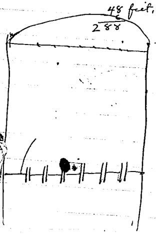


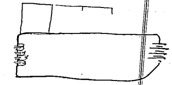
1000.

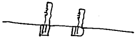
1000.

4 feet.   3   5

1 1/2 inch.



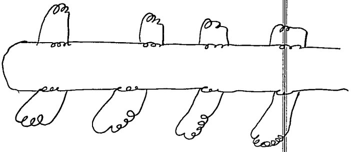


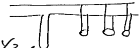


Dec 3, 1878

1654
2
3308.
827
4137.

1/2





10
5
50.

100.

Res of 1/4 wire 250 feet 1/2 ohm.

189.
2
378.
44
472. lbs for 25 feet 1/4 inch. 1/2 ohm .0005
4
1888 — 1/2 inch — 0.12
4
7552 — 1 inch . .03.
4
30208 lbs — only 1/2 of ckt. — 2 — .033.
2
60416
20
1208320

100.

Lights.	Res
1.	100
2	50
4	25
8	12 1/2
16	6 .12
32	3 .06
64	1 .53
128	.76
256	.38
512	.19
1000.	9.

Chas Batchelor

M. N. Force

J. Kruesi

1 ohm

3 ohm

Wm Carman

If I use 3 lights of 100 ohm each in each branch then I use 3000 lights & increase the intensity

1 inch.

600 1' 15000
20
3000,00

25000.

250000.

a

1 1/8 X 3/8 2 1/2 inch 1/8

3/8 .64 3/4

inch surface.

12) 2000 (166
12
80
72
80
72
8

166.

2 feet wide 83 feet long.

total res. .18 hundredths of an ohm.

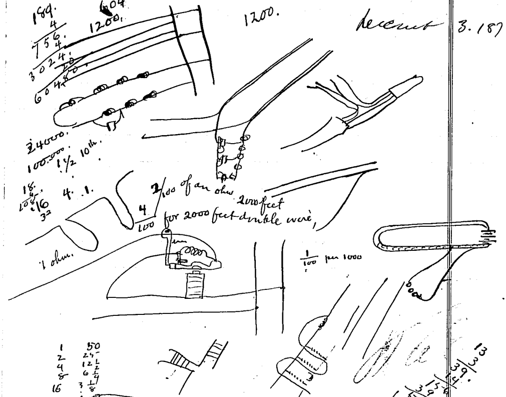
December 3. 1878

189.
4
756.
4
3024.
20
60480

1200.

1200.

604



24000.
100.000.
1 1/2 10th.

18.
4
108
16
32

4. 1.

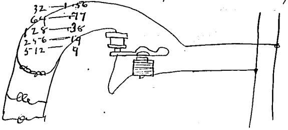
2/100 of an ohm 2000 feet

4/100 for 2000 feet double wire,

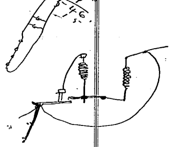
1 ohm.

1/100 per 1000

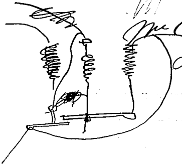
13
3
39.
14
156
39
546
5

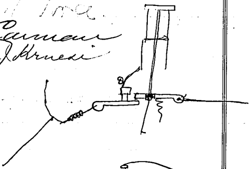


1	50
2	25
4	12 1/2
8	6 1/4
16	3 1/8
32	1.56
64	.77
128	.36
256	.19
512	9



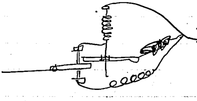
Chas Batchelor
M N Force
McCarman
J Kruesi





35.

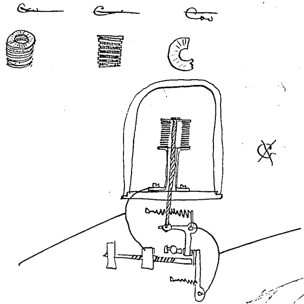
1/3 rd less heat than Copp.

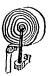


36
14
144
36
504.
5

36
8
288

Dec 3. 1878





Pat.

Chas Batchelor
M N Force
Wm Carman
J. Kruesi

311

(Dec 9 1878)

Machine for Spring washers on the Spirals when heating

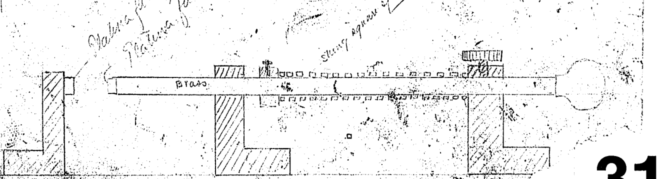
Platina face (flat)

Platina face flat

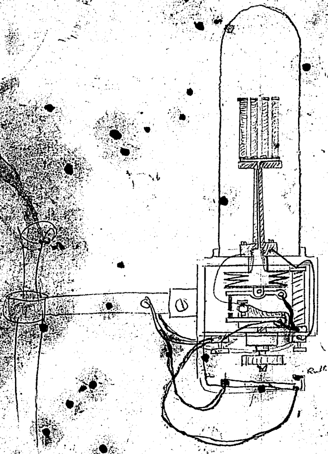
Strong square spring

T A E

Chas Batchelor
M N Force
Wm Carman
J Kruesi



312



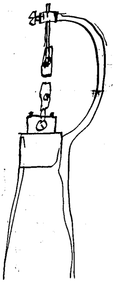
Dec 16. 1878
TAE

Model
Patent office,

J Kruesi

Chas Batchelor
M N Force
Wm Carman

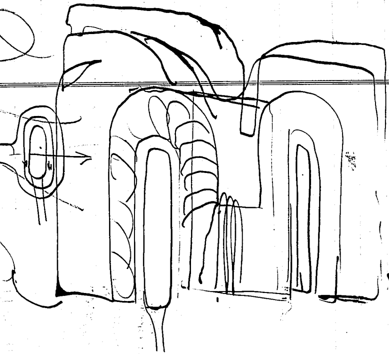
314

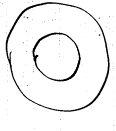


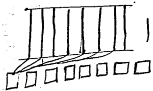
Nickel
Steel
Iron wrought
Cast =
Carbon - Wallace,
Coke -
Telephone Lampblack -
- Pt-Ir 10 pc = 20 pc,
Platinum
- Copper - Silver - Zinc
Cobalt.
Chromium
Aluminum
Silicon

Dec 21 1878
TAE

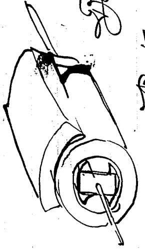
3156







Round
Round Writing



Boston

Boston

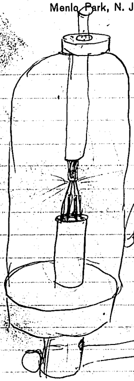
Boston

Boston Boston Boston

Boston

T. A. EDISON. Electric Light
Dec 22

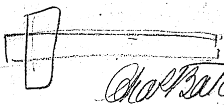
Menlo Park, N. J., 187



T.A.E.

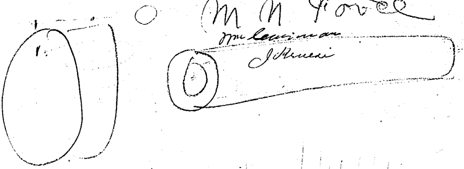
Chas Batchelor
Dec 23 1878
M N Force
Wm Carman
J Kruesi

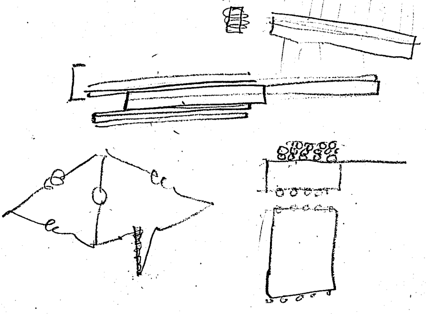
Electric Light
Dec 26, 1878



T.A.E.

Chas Batchelor
M N Force
Wm Carman
J Kruesi





Electric Light Dec 26..1828

Coating wire with a non conductor of heat

TAE

Solidity strength + capability of long service

J Kruesi
Wm Carman

Cheapness,

Chas Batchelor
M N Force

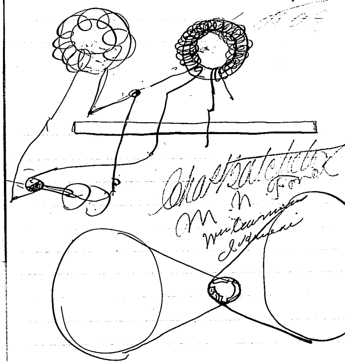
non liability to [illegible]

noiseless

Compactness

319

Electric Light
Dec 26. 1878



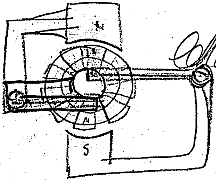
Chas Batchelor
M N Force
Wm Carman
J Kruesi

T. A. EDISON.

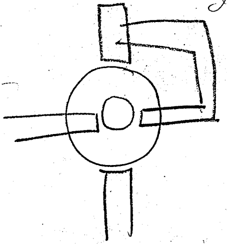
Menlo Park, N. J., 187

318

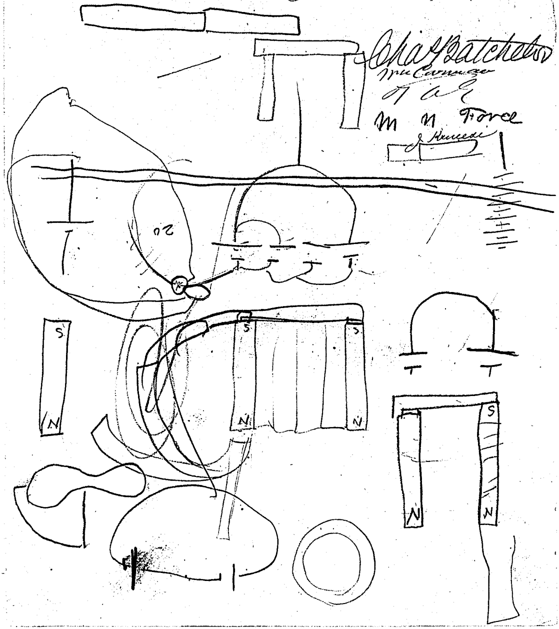
Electric Light
Jan 3 1879



Chas Batchelor
T A E
M N Force
Wm Carman
J Kruesi



Electric Light
Jan 3. 1879


20
S
N
S
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N
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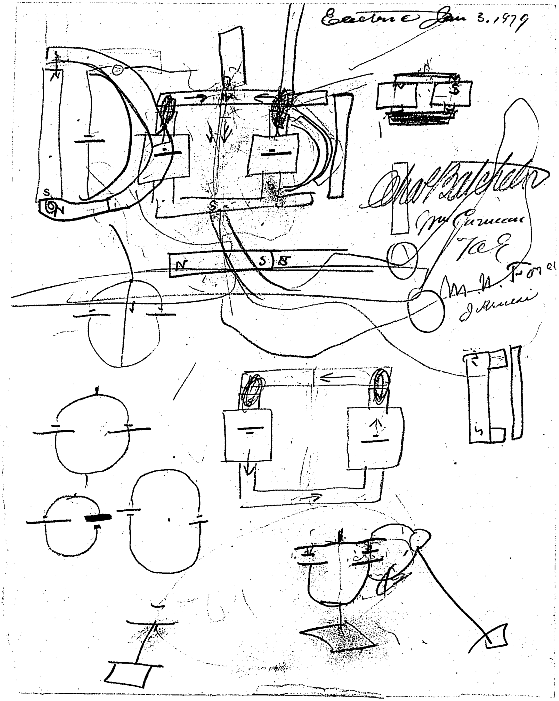
Chas Batchelor
Jno Carman
T A E
M N Force
J Kruesi

Electric Jan 3.1879


S
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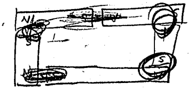
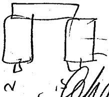
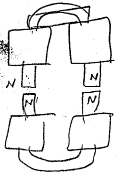
Chas Batchelor
Wm Carman
TAE
M. N. Force
J Kruesi

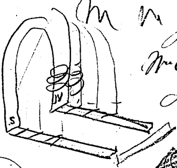
Electric Light
Jan 3 1879

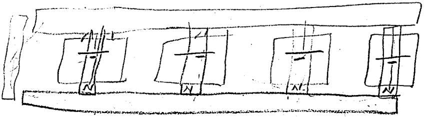


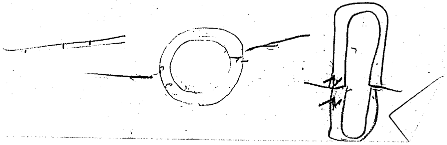


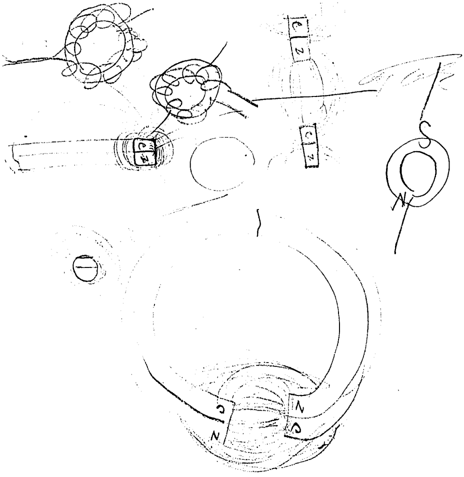
Chas Batchelor
M N Force
J F Ott
Wm Carman
J Kruesi










C
Z
C
Z
C
Z
S
N
C
N
N
C

Electric Light

Jan 4 1879

Chas Batchelor

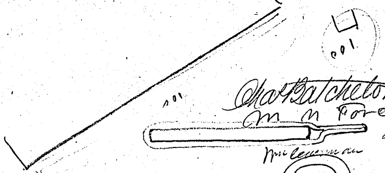
M N Force

Wm Carman J Kruesi

Electric Light

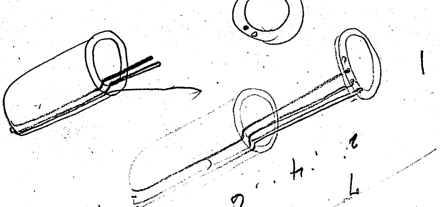
Jan 4

1879

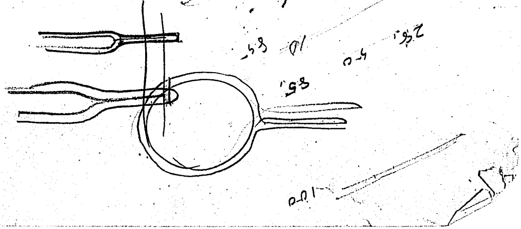


Chas Batchelor
M N Force
TAE

Wm Carman
J Kruesi

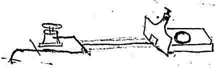

1
2
4
6
7

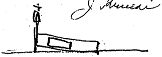
28.
50
10.
85.
85.

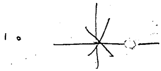


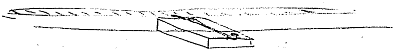
Electric Light
Jan 4, 1879

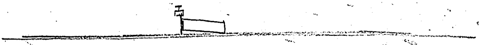
Chas Batchelor
TAE
M N Force
Jno McCarmican
J Kruesi





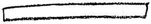




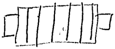


1/6 2

Electric Light
Jan 4, 1879

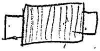


Wm Carman
Chas Batchelor
TAE
M. N. Force
J Kruesi



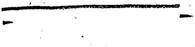
18,60

186.00
1,86



1200
10
61

1 200
14



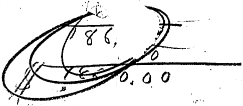
10
10
100
200

10
10
100

200

450
11

40
40
40

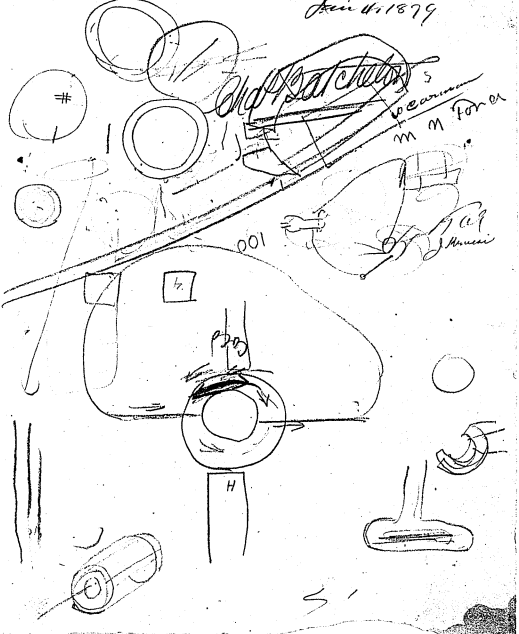


186,
0.00

186.00
18.60
1,86

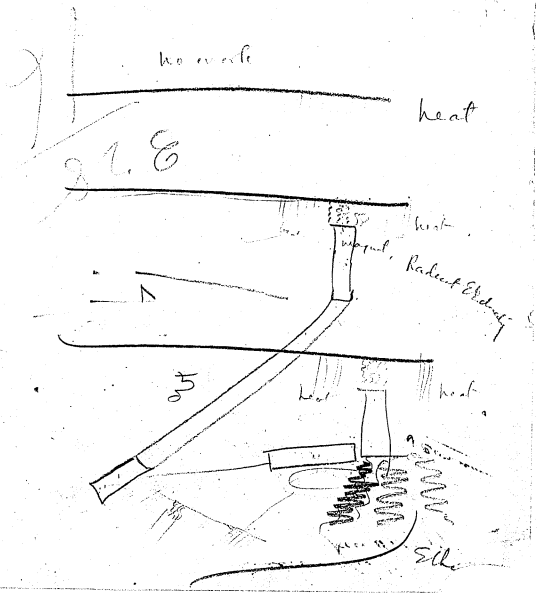
186.00

Electric Light
Jan 11 1879


#
S
M N Force
100
b
H

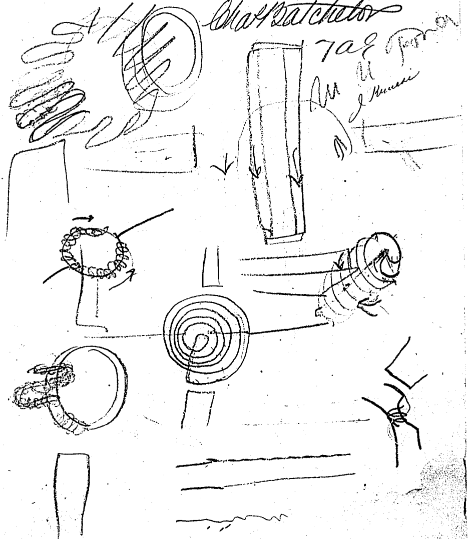
Chas Batchelor

J Kruesi

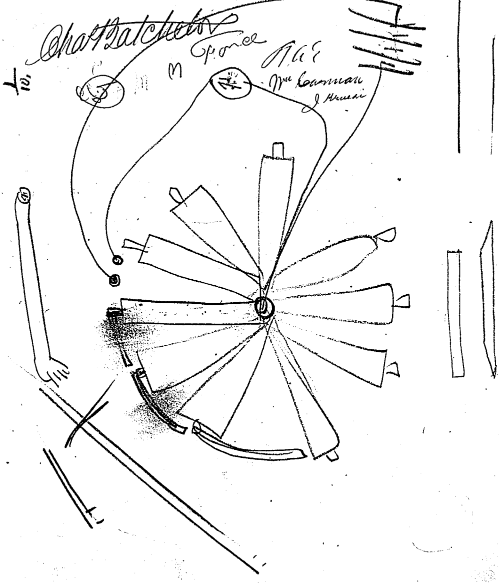

no work
heat
heat
magnet, Radiant Electricity
heat
heat
Elec

Electric Light
Jan 4, 1879

Wm Carman
Chas Batchelor
TAE
J Kruesi



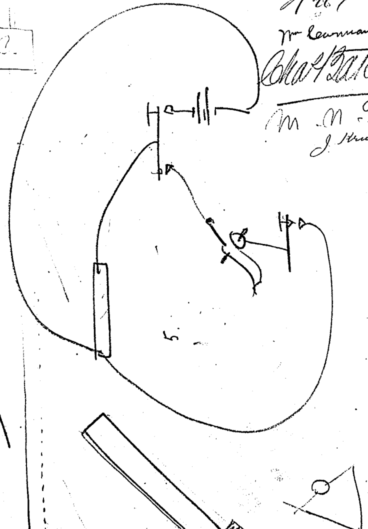
Electric Light
Jan 4 1879



Chas Batchelor
M Force
TAE
Wm Carman
J Kruesi

Electric Light
Jan 4 1879

Wm Carman
Chas Batchelor
M. N. Force
J. Kruesi



Electric Light TAE

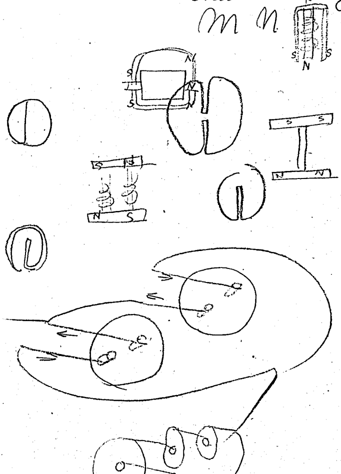
Jan 4 1879

Wm Carman

Chas Batchelor

M N Force

J Kruesi



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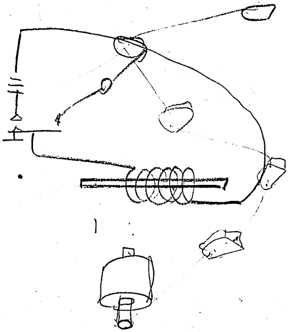
Electric Light
Jan 4 1879
TAE

Chas Batchelor
M. N. Force
Wm Carman
J Kruesi



17 3/4 -

4

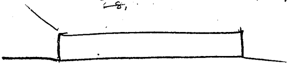
~~18,~~ 24

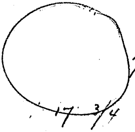
~~183/4~~
17 3/4

36 1/2
2
73.

8.625

9.42





7/- 2 1 inch

4, turns, 8 .625
8 " 4 .06.
16. 1 .78.

16
9
144.
.432.
3

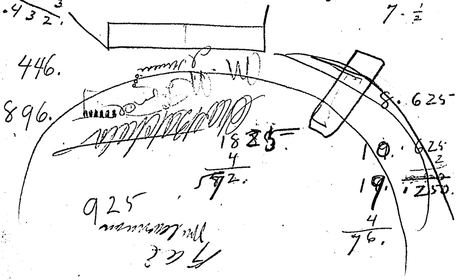
17 3/4
15 3/4

8

7 1/2

446.

896.



1825
4
592.

8.625

10.625
2
19.1250.

19
4
76.

925

Electric Light Jan 14 1879

TAE

McLaurin

Chas Batchelor

M N Force

J Kruesi

334

Electric Light

Jan 4, 1879

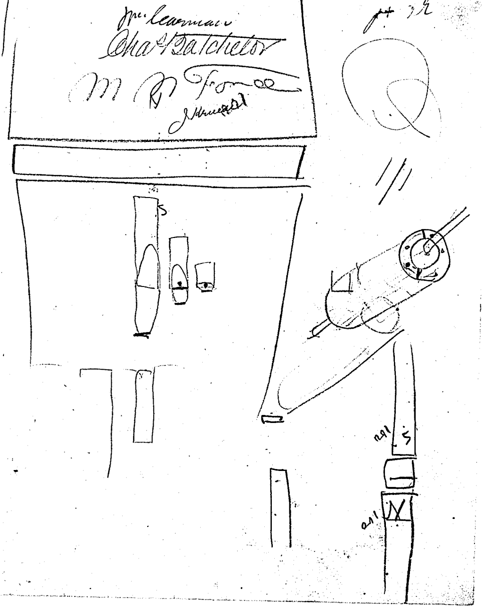
pt 72

Jno. Learman

Chas Batchelor

M N Force

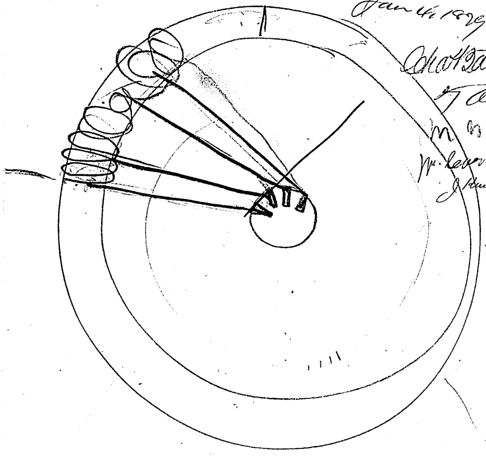
J Kruesi

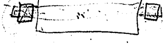


335

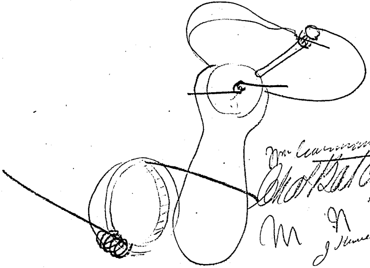
Electric Lights
Jan 4, 1879

Chas Batchelor
T A E
M. N. Force
Wm. Carman
J Kruesi

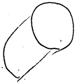


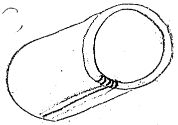


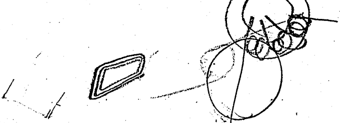
Electric Light.
Jan 4 1879
TAE



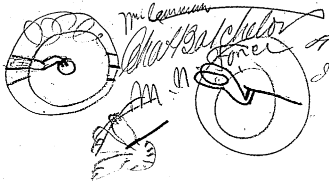
Wm Carman
Chas Batchelor
M N Force
J Kruesi







Electric Light Jan 4, 1879

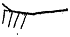


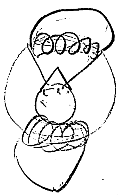
Chas Batchelor

Force

TAE

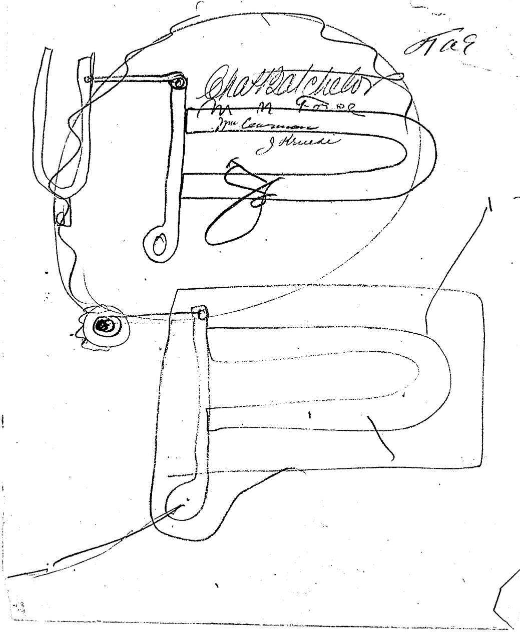
J Kruesi





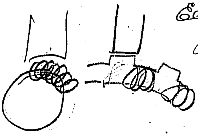
Electric Light
Jan 4 1879

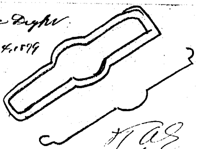
TAE

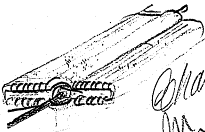


Chas Batchelor
M N Force
Wm Carman
J Kruesi

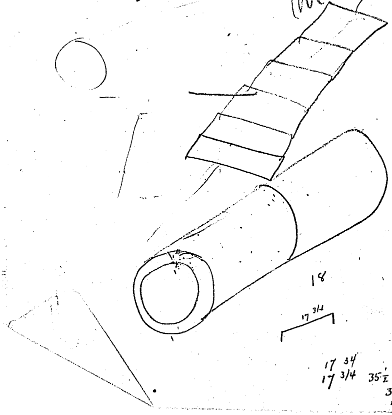
Electric Light
Jan 4, 1879







TAE
Wm Carman
Chas Batchelor
M N Force
J Kruesi



3 feet 1 inch

17. 3/4 73

18

34. 1/

37.

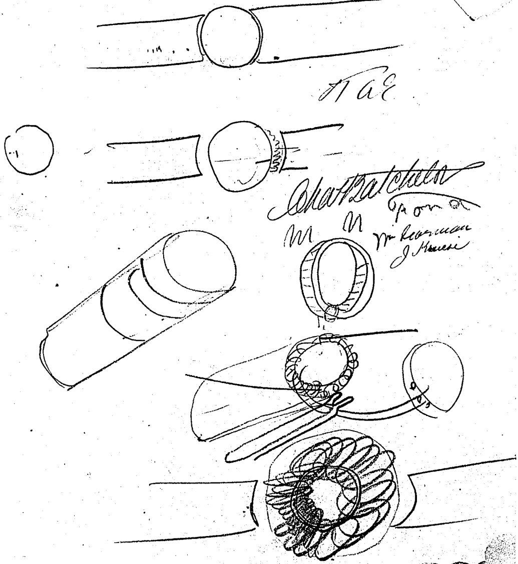
17 3/4

17 3/4

17 34
17 3/4 35½ 35½ 1
37.

340

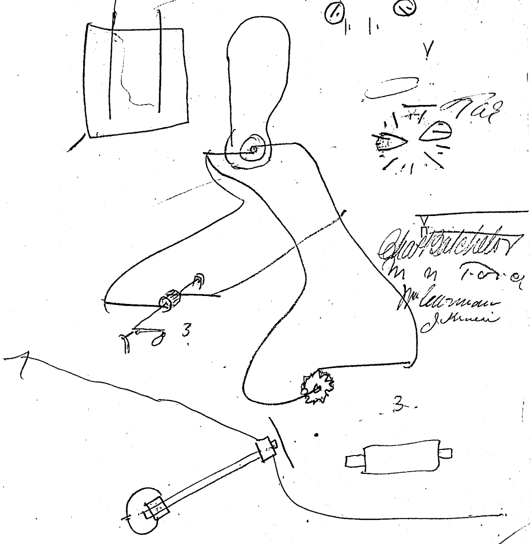
Electric Light
Jan 4, 1879



TAE

Chas Batchelor
F R Upton
Wm Carman
J Kruesi

Electric Light
Jan 4, 1879



Chas Batchelor
M N Force
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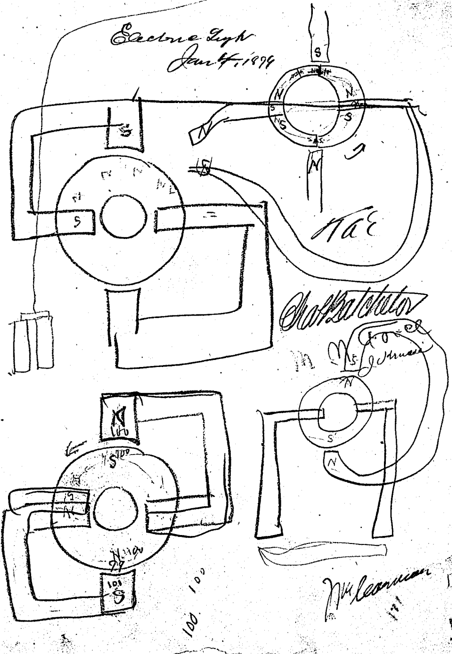
J Kruesi

Electric Light
Jan 4, 1879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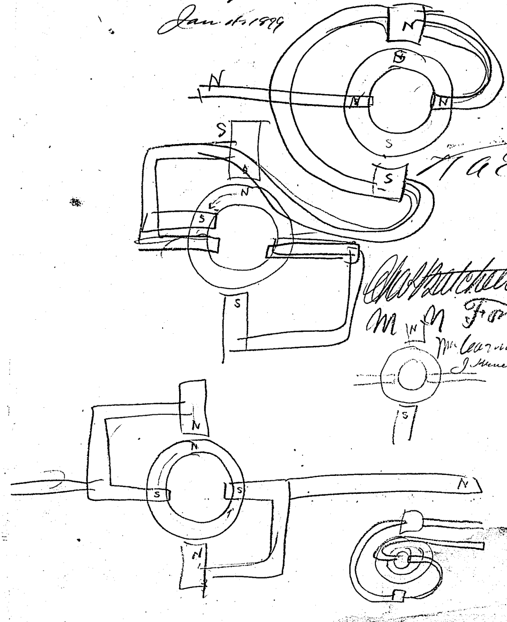
TAE

Chas Batchelor

J. Kruesi

Wm Carman

Electric Light
Jan 11 1879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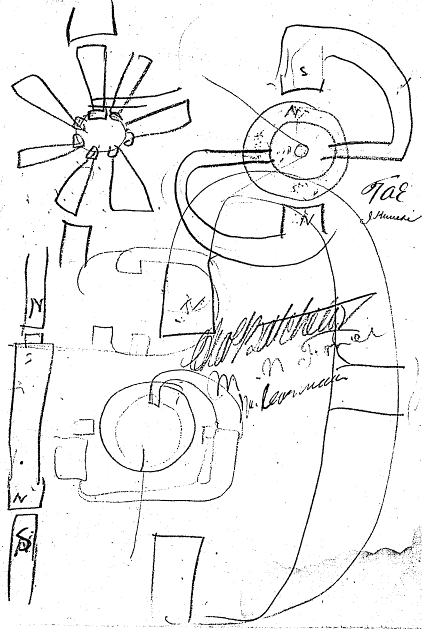
TAE

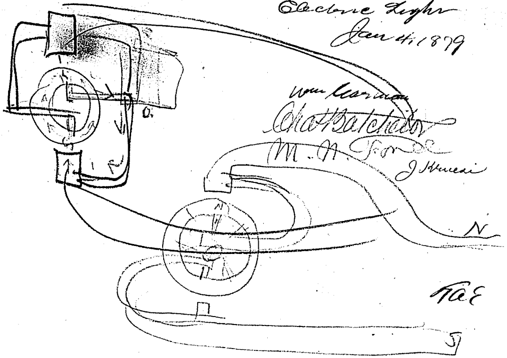
Chas Batchelor
M N Force
Wm Carman
J Kruesi

Electric Light
Jan 4 1880



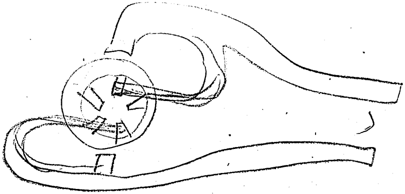
TAE
J Kruesi
Chas Batchelor
Wm Carman

Electric Light
Jan 4, 1879



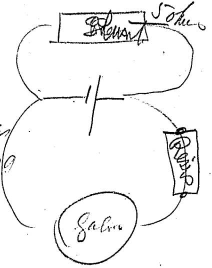
Wm Carman
Chas Batchelor
M. N. Force
J Kruesi

TAE



$\frac{5}{16}$ $\frac{2\frac{1}{2}}{8}$

Electric Light
Jan ~~4th~~. 1879



$\frac{15}{8}$ $\frac{2\frac{1}{2}}{8}$

$\frac{1\frac{1}{2}}{8}$

2

Take new resis from original — 10
up

and add new res to total galv $\frac{3}{8\frac{1}{2}}$
7 $1\frac{1}{2}$

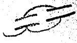
TAE
M N Force
Wm Carman
J Johnson

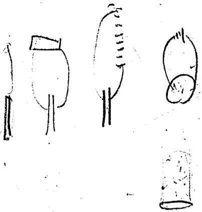
multiply by Shunt 5

$5 \times \frac{3}{8\frac{1}{2}}$

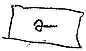
347

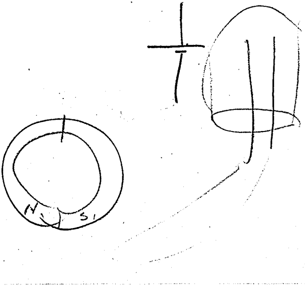
Electric Light
Jan 4. 1879

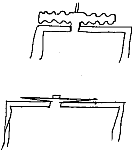




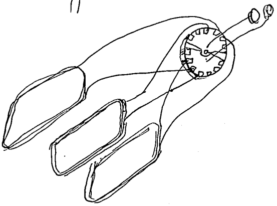
Chas Batchelor
M N Force
Wm Carman
J Kruesi

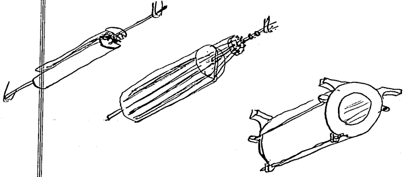


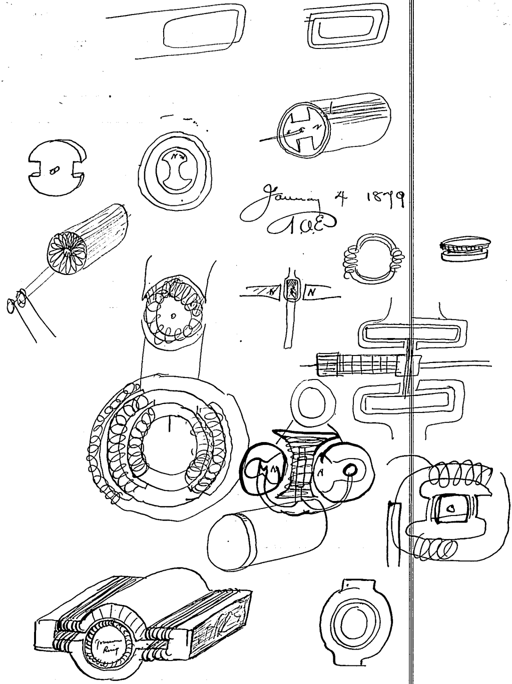




Jan 4 1879
Tae






N
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N
Gramme Ring

January 4 1879
T.A.E.

TAE January 4 1879

Temperature atmosphere 62.
current raises it to 64 deg on each inch.
12 inchs radiating surface.

12. 128

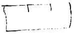
If reduced to 3 inches radiating surface it brings it to 256°
If " 3/4 inch " " " 1024

This reasoning must be false, the 2° of heat above the atmosphere should be the only ones used in the calculation hence

3 inches 8° on each inch on 3/4 inch. 32° deg. on .19
128,
If two foot long total heat 48. 2 on each inch 6 inch 8 1/2 32
~~.38~~ .. 128. .09. 512,
3 foot. 36. 96, , 1 foot 8° 3 inch .32. 3/4. 128
~~37~~.19 512. 0450, 2048,

1 foot to 3/4 inch. 32 deg
32
4
128. 4 feet.

10%



6400,
1600
40 .4. feet. ~~6~~ foot. 8 . 3. 32 3/4
400 . 6400.
2
80. 8 feet 12,800
2
16 16 25,600
2
32. 32 51,200
2
2048

100, 1,200,
2 600. - 100
4 72. 25
8 3 .6
16

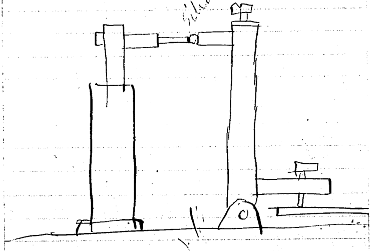
T. A. EDISON.

Menlo Park, N. J., Jan 12th 1879

[illegible]

Silicium etc

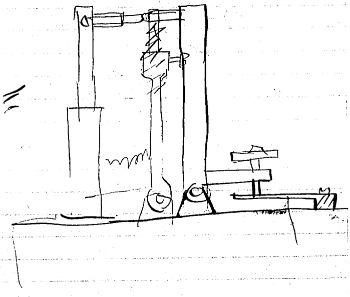
TAE



SON.

Menlo Park, N. J., Jany 12 1879

TAE



Electric Burners 1881

Caveat (1)

The invention consists in various devices for constructing Electric Burners and distributing the Current to the same.

I have ascertained that spirals of wires formed of finely divided conductors such as Silicum Carbon, Boron and other infusible substances can be formed. The fine wires are ~~made~~ formed and put in spiral form simultaneously, by employing a peculiar mould and great pressure. For instance suppose it is required to form a spiral of carbon wire $\frac{10}{1000}$ of an inch in diameter, such spiral being 3/16 of an inch diameter. A Mould is made see fig 1 consisting of a die C with a bushing B screwed into the die, a taper hole is bored through the bushing having an orifice of about 9/1000 of an inch, through this the Carbon which is mixed with an agglutinant substance such as tar is forced by great pressure. A is the Carbon mixture. D D' are steel washers. E the End of the press screw; The object of the washers is to allow of a greater pressure than would otherwise be possible were a plunger used the latter bending under great pressure.

② Caveat.

The Carbon as it issues may if there be sufficient tar mixed with it be wound in spiral form on a mandril, with thread cut in it, into which the Carbon presses; this is baked and the mandril unscrewed to allow of the further baking of the spiral at a much high temperature; but if there be but little ~~tar~~ mixed with the Carbon an ~~attachment~~ is made ~~of~~ to the orifice of B (fig 1) - which gives the soft carbon a spiral ~~twist~~ as it issues from the ~~attachment~~ the latter being only an Extension of B curved to represent nearly one turn of the Spiral to be formed, ~~Another method of forming the spiral Consists.~~ Spirals of various sizes may be formed so that one spiral may fit ~~also~~ inside the other & thus allow of a great resistance with a small radiating surface when Employed as an ~~in the~~ Electric Burner.

Another method of forming the spirals consists in Cutting a thread in a rod of nickel or other refractory metal. This thread represents the spiral to be formed. Into this is forced by pressure the plastic or semiplastic material ~~by pres~~ and after a ~~screw~~ plunger forces out all of the material Except in the threads. The two ends of the spiral are so arranged that the plastic material will ~~Enclose~~ (or surround) platinum or other metallic wires so as to convey the current to the spiral, after the plastic material has been moulded it is ~~bad~~ baked in the mould so as to harden it sufficiently to allow of it being withdrawn from the mould & baked at a higher temperature, The mould might be a plaster of paris one ~~then the~~ formed by ~~mould~~ allowing the liquid plaster of Paris to set around the top and ~~in~~ unscrewing the same & forcing in the Carbon; Then the Carbon could be baked in one operation and at a high temperature; Another method of forming the spiral wires consists in forming spirals of wood and Carbonizing them in moulds.

The best material for making the plastic Carbon consists in exposing in a sealed Crucible ~~to~~ a high temperature for several hours ordinary lampblack, afterward this is × mixed with agglutinant substances such as honey, Tar, turpentine Camphor Sugar & other viscous substance containing a large amount of Carbon

+ When ~~Silicon~~ silicium is used a small quantity of the Oxide of Silicium is mixed with it, but I am still engaged in experimenting upon and endeavoring to determine which is the best and most perfect

4 Caveat

aglutenant to mix with powdered Silicium, When Silicium is used platina wires cannot be used to make connection with the spirals as Silicium combines with platina hence other metal must take it place although if the End of the spiral be made of large size so that the temperature will not raise above a red heat platina may be used. ~~One disadvantage of Silicium~~ is ~~that it reduces power or rather~~

Another method consists in working into worsted or other fibrous thread, plaster conducting matter, winding in a spiral & afterwards baking & carbonizing the string or thread, The spirals are to be placed in a sealed vacuum and ~~the air~~ connected to the source of electric energy by platinum wires, The Carbon, Silicon Boron or other finely divided metal made thus in the form of wires may be coated with an infusible non conducting oxide such as Alumina, Zirconia, Lime, Magnesia to ~~prevent~~ pyroinsulate it but in most cases this will not be necessary as the substance will hold its position, not becoming soft if it be carbon Silicon ~~C~~ Boron, Titanium, Chromium at very high temperature, 5 Caveat

Another part of my invention consists in employing a number of continuously rotating dynamo machines ~~connected to~~ in all sections of the city ~~across~~ across the main street conductors multiple arc; each house is provided with one of these motors and a wire leading from the cellar ~~where it is placed to~~ a room above serves to connect or disconnect the motor from the circuit. The motor when connected owing to its high resistance and the small friction of the parts. requires but a small number of foot lbs of energy to keep it continuously rotating, say 300 foot lbs.

in addition to the regular Commutator connected to the wires of the dynamo there are ~~is a~~ one or more subsidiary Commutators with ~~as many blocks as there are~~ ~~rings 10 blocks with ten blocks~~ ~~each, a brush rotating a single~~ ~~block ode~~ with 10 blocks in each These Commutators are not carried around by the rotating spindle but ~~like~~ rotating shaft passes through the centre of the shell carrying the blocks and a spring connected to the shaft & one of the main wires

6 Caveat

rotates with the shaft and sweeps over the face of the 10 commutator blocks at each revolution of the shaft = to each commutator block a wire proceeds to a lamp of 10 ohms resistance the other ends of all the lamps coming together and are connected to the other main wire, ~~when all the lamps are connected~~ any lamp may be connected by turning a button at the lamp which closes the circuit. When all the lamps are connected. and the Engine rotating. the amount of current passing to many (?) lamps is entirely independent of the speed of the Engine but one lamp at a time is placed in multiple arc thus keeping the resistance of the House or Branch constantly 10 ohms even if the whole of the lamps are burning, and this is just equivalent to using 10 lamps of 100 ohms each constantly in multiple arc ~~each~~ The Electromotive force required in both cases is the same, and all that the Engine accomplishes is to ~~[illegible]~~ reduce the resistance of the lamp from 100 to 10 ohms the latter being an easier problem

7 Caveat,

To reduce the resistance of the lamps to one ohm Each keeping the Electromotor force & main conductors the same. another arrangement of the Engine is required. The lamps having one ohm resistance are arranged in a series of 10 and Each lamp has a switch 6/11 by which it may be inserted or withdrawn from the circuit a seperate wire from each lamp goes to a commutator block. and over this passes the spring connected to the revolving Shaft, ~~w ad~~ (this spring ~~being~~ is connected to ~~the~~ one main line, The wire from the other main passes through the 10 lamps returns back through each lamp but is not connected therewith, a switch at Each lamp connect this return wire with a commutator block. the Engine ~~throwing~~ in rotating increases the time of contact with the main circuit as Each lamp is thrown in circuit and Each commutator block connected both operation being done simultaneously by a switch in the lamp! Fig 2 Shows this arrangement. 7 8 9 10 11 & 12 are the lamps A B main

Caveat

main conductors 15 Commutator 1 2 3 4 5. 6 Wires leading from the blocks on 15 to the lamps. 13 a switch for starting the motor.

There are various method of working the increase of contact with the main Circuit. for instance a Commutator might be used with a single block, which was only a 10th part of the Circumference of the commutator shell at one End & covered the whole circumference at the other End, a sliding spring might be used which slides from one End to the other by means of the movement of a centrifugal governor the movement being obtained by increase of speed in the Engine, the Engine Circuit might pass through the lamp stand. and a resistance might be thrown in the Engine circuit or out when the lamp was connected, the increase or decrease of speed of the Engine would cause the governor to slide the spring along to give more or less contact

Fig 1

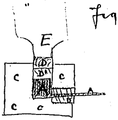
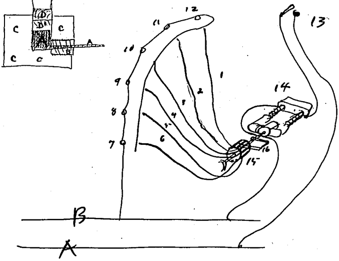


Fig 2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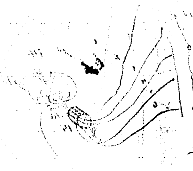
Caveat E.L.

TAE says N.G.
File away as Evidence



362/16

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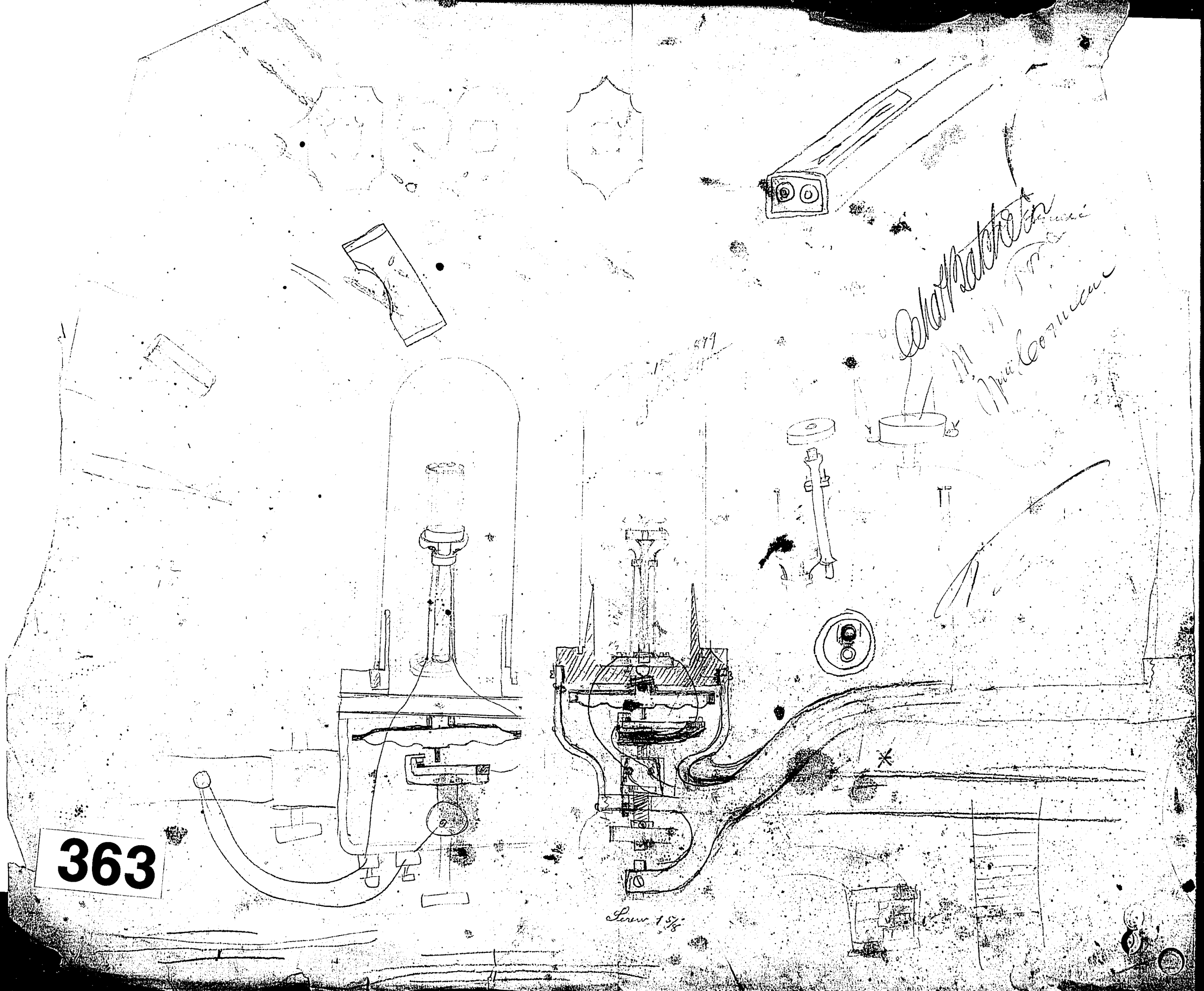
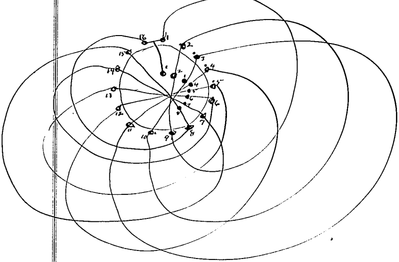


1879
Screw 1 5/8

Chas Batchelor
Wm Carman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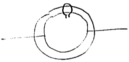
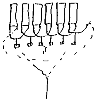
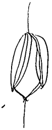
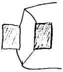
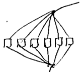
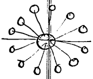


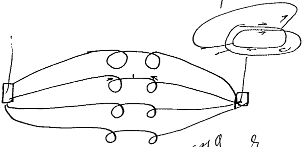






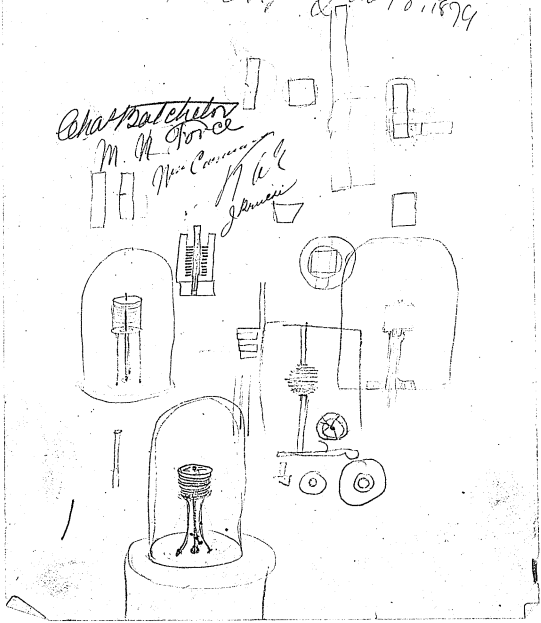




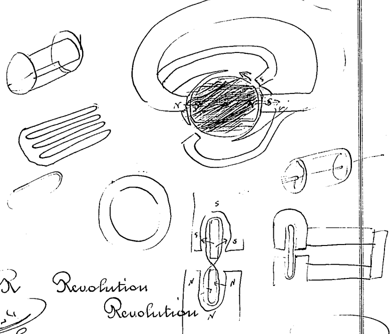


Jany 18 1879

Electric Light Jan 18, 1879



Chas Batchelor
M N Force
Wm Carman
T A E
J Kruesi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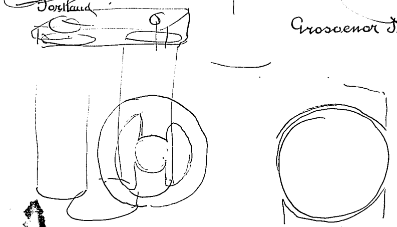

Grosvenor P. Lowrey

Jany 21 1879

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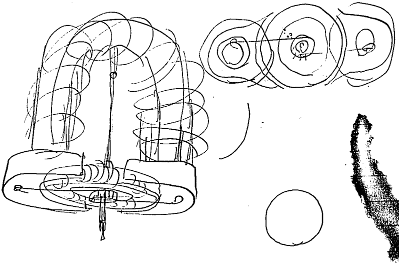

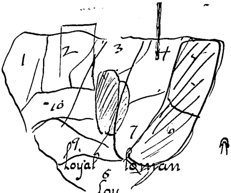

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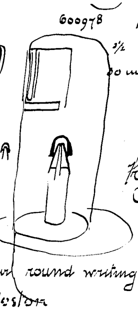
30 inches

$\frac{1}{5}$ of the amount of gas =



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6

$\frac{1}{6}$ 1 12'00-inches per hour round writing

$\frac{1}{6}$ of the gas

· Boston

L

Boston 41-turns 3 cubic inches per min

Boston Twenty

$$\begin{array}{r} 82 \\ \hline 164 \end{array}$$

6
9
15·

Portchester

$$\begin{array}{r} 41 \\ 8 \\ \hline 328 \end{array}$$

$$\begin{array}{r} 12 \\ 60 \\ \hline 720. \end{array}$$

156

Worcester

$$\begin{array}{r} 41 \\ 15 \\ \hline 205 \\ 41 \\ \hline 615 \end{array}$$

26000

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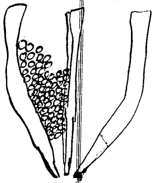

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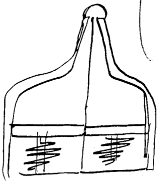
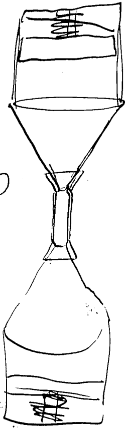


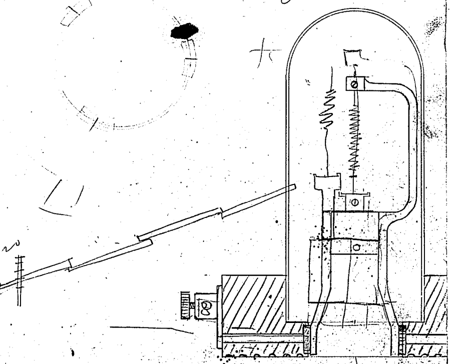


Feby 3rd, 1878
T.A.E.

Vacuum Experiments
for Electric Light.

Feb 3 1879
Chas Batchelor
J Kruesi

$2^2 = 2$



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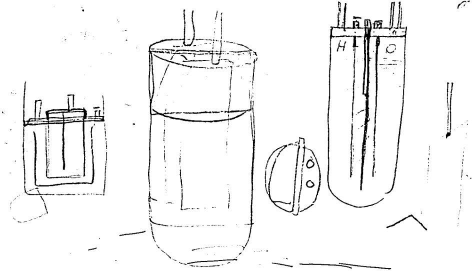
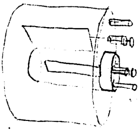
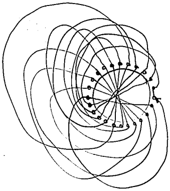
Electric Light
Feb. 4th 1879
J.K.

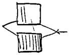


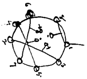


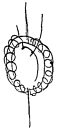
$\frac{369}{16}$

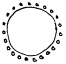


Feby 10 1879 TAE









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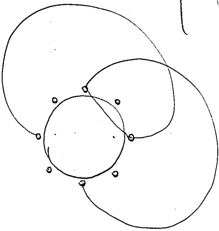

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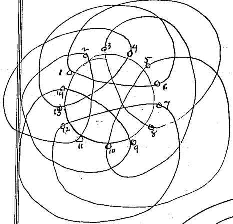
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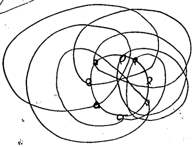

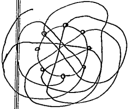

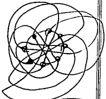

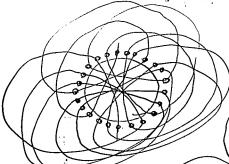

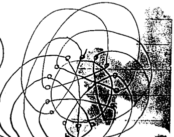

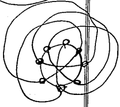

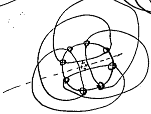

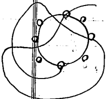

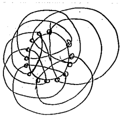

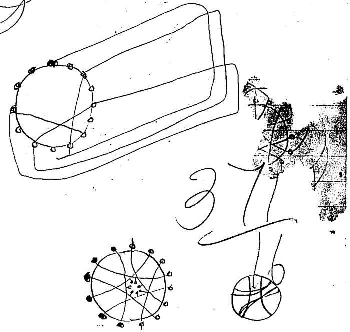

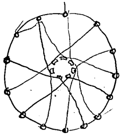

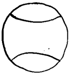

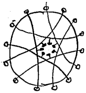

Febr. 12th 1879

John Ott

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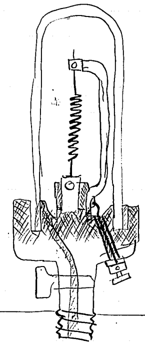
3 ~~of these~~ more -

J.K.



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Chas Batchelor

M N Force

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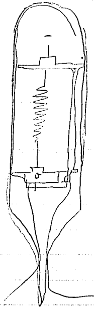
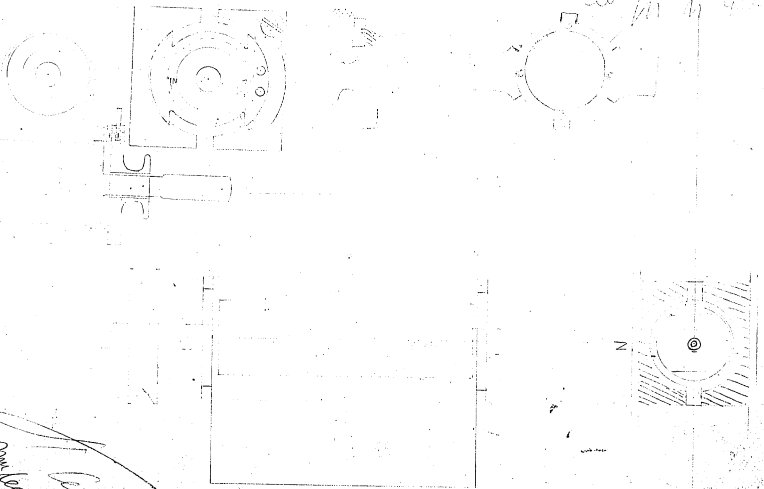


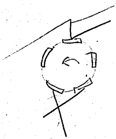
Electric Light &c.

Chas Batchelor



Wm Carman

373



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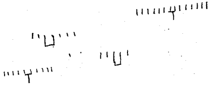

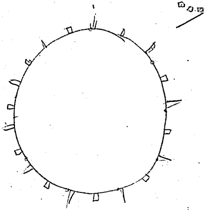

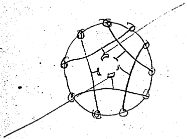

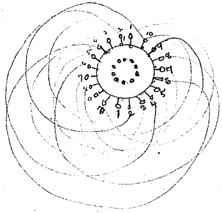

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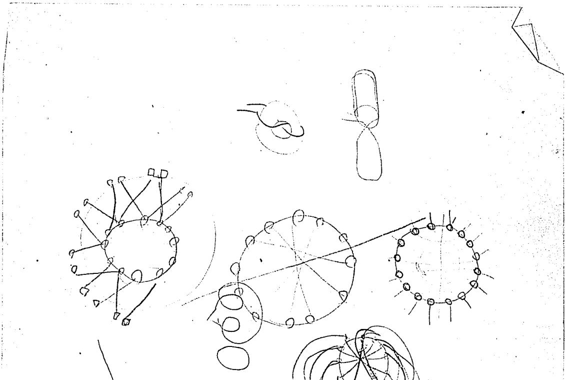
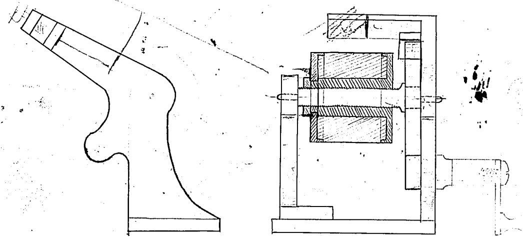
7 to 7
5 to 5



Feby 26 1879 TAE

J. Moto Receiver No. 29 Febu 28. 1879



199 (G)
51 (G)

(Chalk Telephone?)
17SA

7/32 9

376
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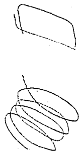
Diam of inside 5·0312 Circum 15·803
" " outside 5·656 " 14·765
Length of lap $\frac{1}{18}$ of circle on No 3 = ·92
Diam line of joint 5·2812 circum 16·59
Diam inside of rough 4·97 circum 15·59
Diam outside of rough 5·83 circum 18·30
Diam

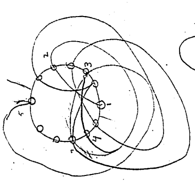
~~No 1~~ ~~5·83 +~~ ~~18·30 + 1·017~~ ~~19·317~~
~~3 =~~
No 1 = 18·30
3 = 16·59

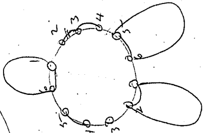
18·32
92
19·22

15·592
92
16·51

376



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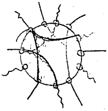
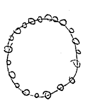
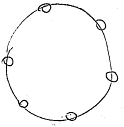
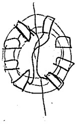
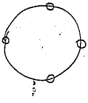




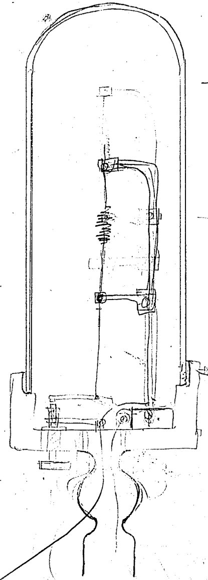


Feby 29 1879
TAE





No. 44 March 6th 1879
J K.



Chas H Batchelor
M N Force
Wm Carman

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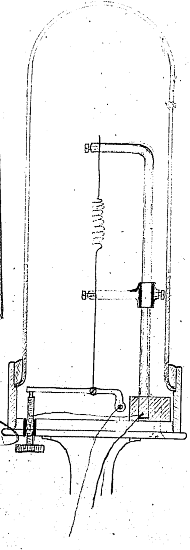
No. 44 March 6th 1879
E. Light for Lecture
at Boston

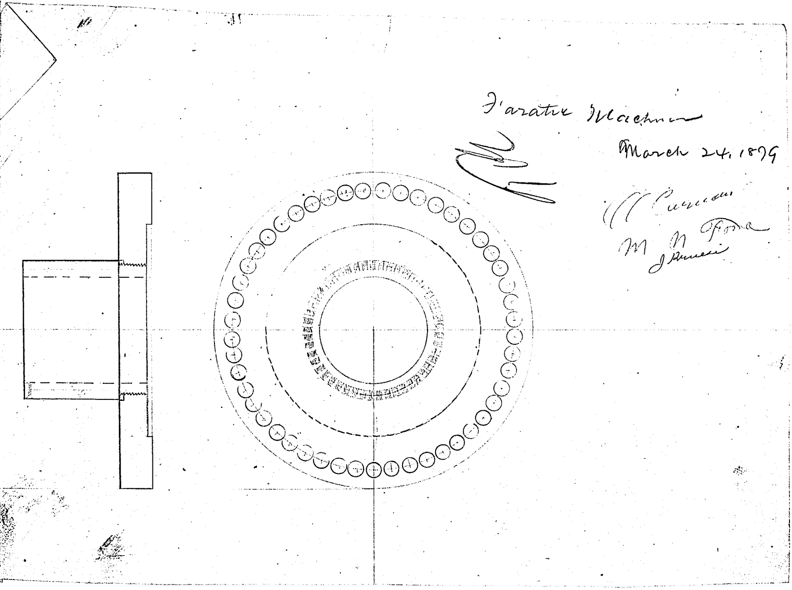
John F Ott

5



Chas H Batchelor
M N Force
Wm Carman
J Kruesi

378



Faradic Machine

March 24, 1879

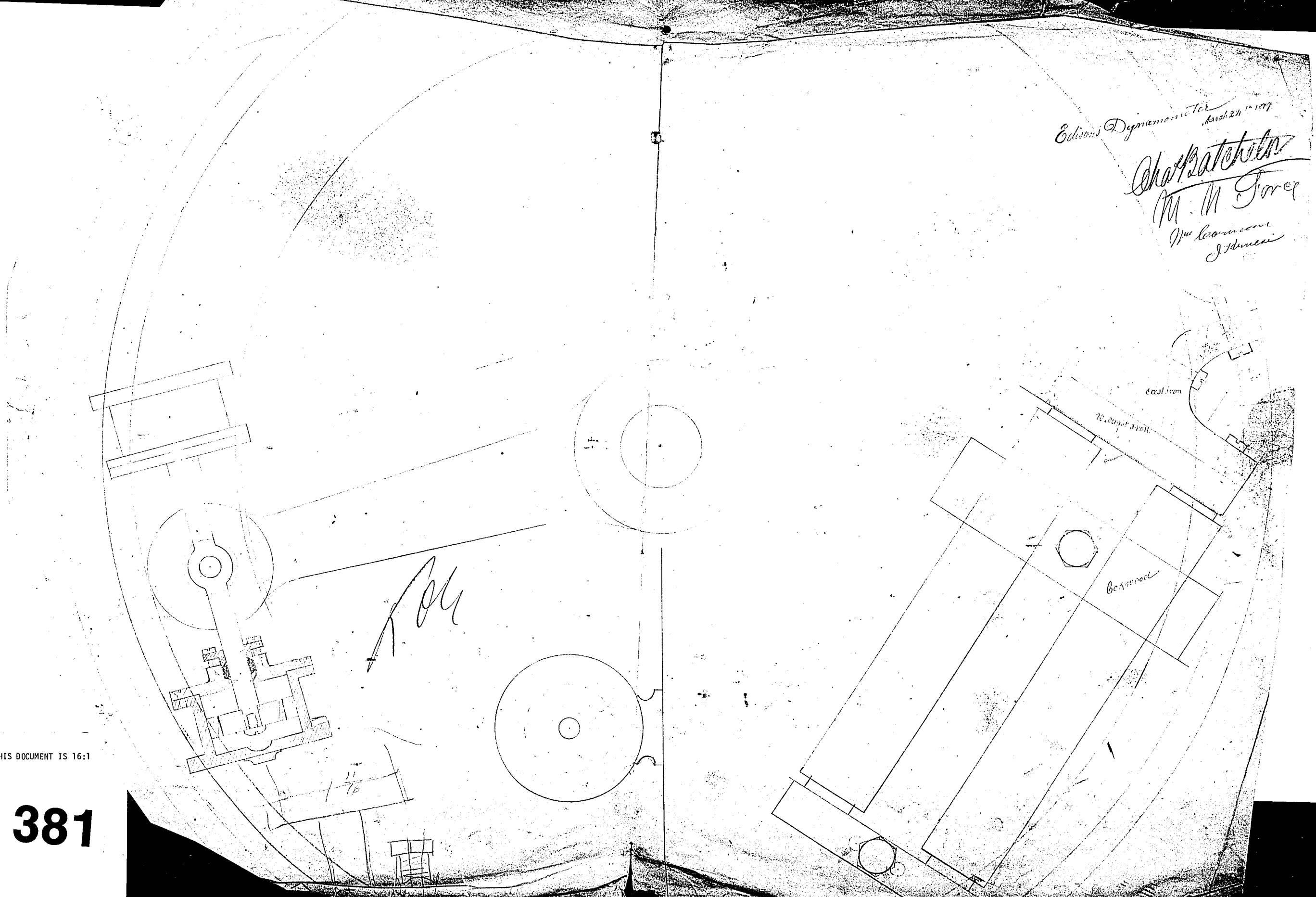
W Carman

M N Force

J Kruesi

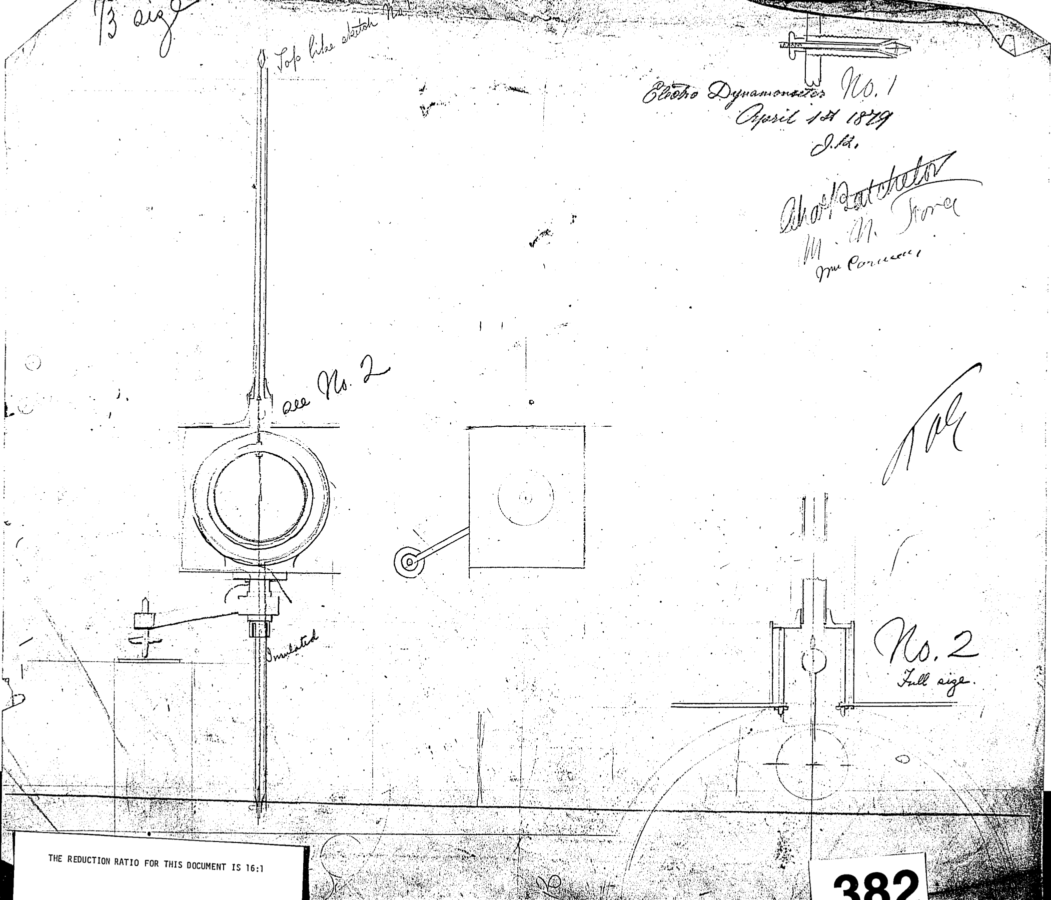
THE REDUCTION RATIO FOR THIS DOCUMENT IS 16:1

381


Cast iron
Wrought iron
Boxwood
1 11/16
Roll

Edisons Dynamometer March 24th 1879

Chas Batchelor
M. N. Force
Wm Carman
J Kruesi

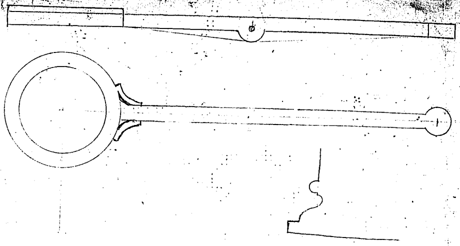

1/3 size
Top like sketch No. 1
see No. 2
Insulated
No. 2
Full size.

Electro Dynamometer No. 1
April 1st 1879
J.K.

Chas Batchelor
M. N. Force
Wm Carman

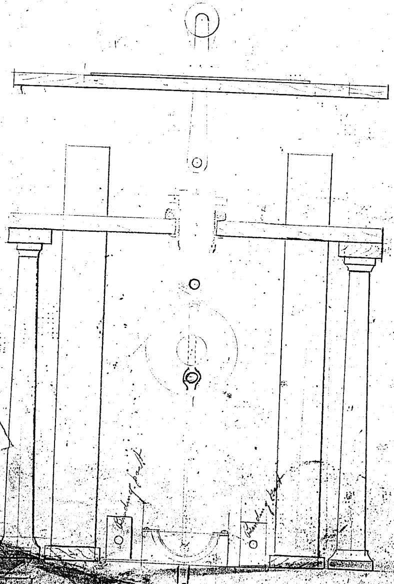
TAE

THE REDUCTION RATIO FOR THIS DOCUMENT IS 16:1

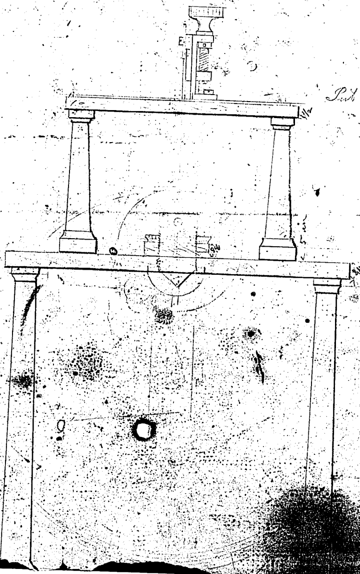


3/4
1/2 base
12 1/2 inside of ring

March



Bushing post
Bushing post



Put on Longer screw

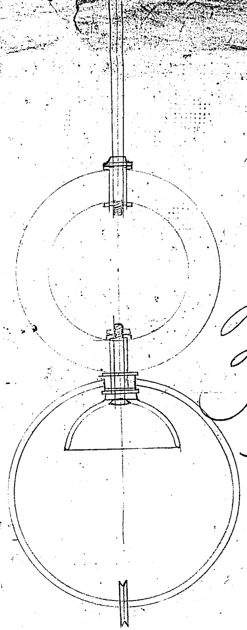
38
1.15
18

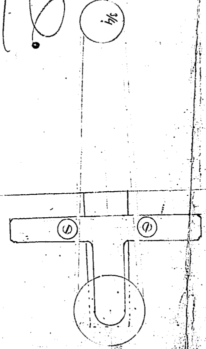
383

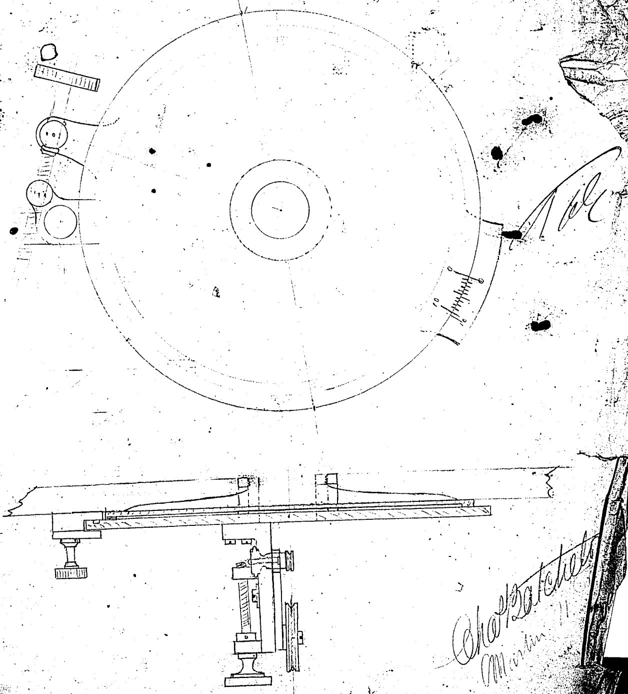
THE REDUCTION RATIO FOR THIS DOCUMENT IS 16:1

Electro Dynamometer
J. Kruesi April 1st 1879
J. McCamen

383
16



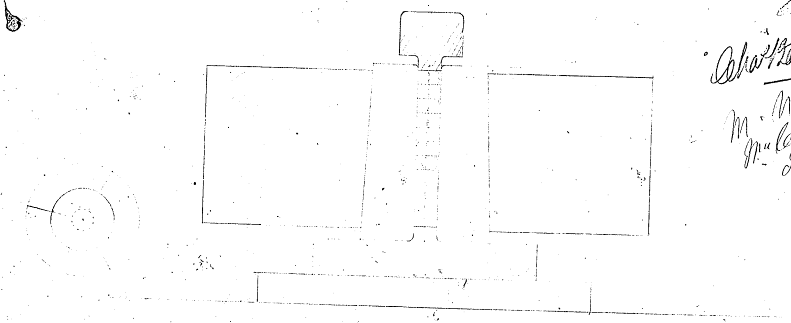




Chas Batchelor
Martin ..

THE REDUCTION RATIO FOR THIS DOCUMENT IS 16:1

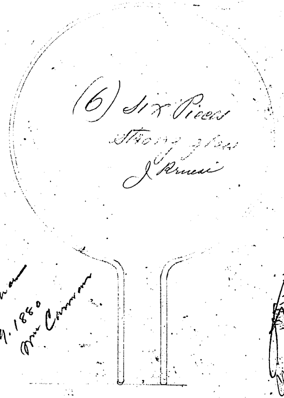
383



No 102 Lime mould
Bright
Oct 5th 1879

Chas Batchelor
M. N. Force
Jno McCormon
J Kruesi

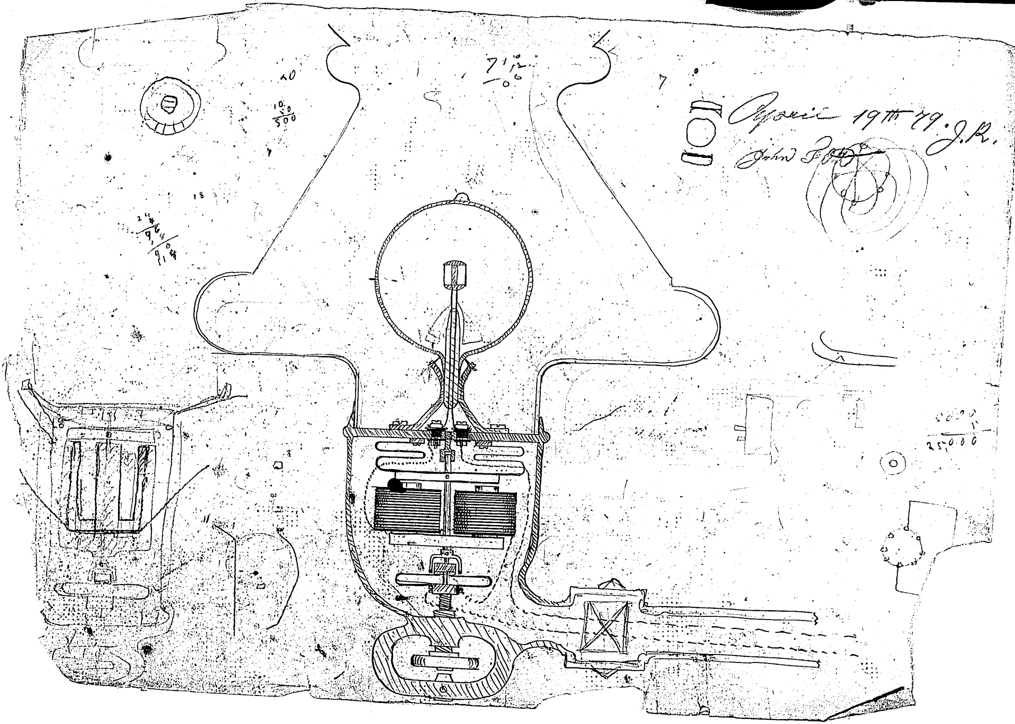
THE REDUCTION RATIO FOR THIS DOCUMENT IS 16:1



(6) Six Pieces
Strong glass
J Kruesi

came to my notice
Apr 19. 1880
Jno McCormon

Jno McCormon
M N Force



April 19th 79. J.K.

John P

THE REDUCTION RATIO FOR THIS DOCUMENT IS 16:1

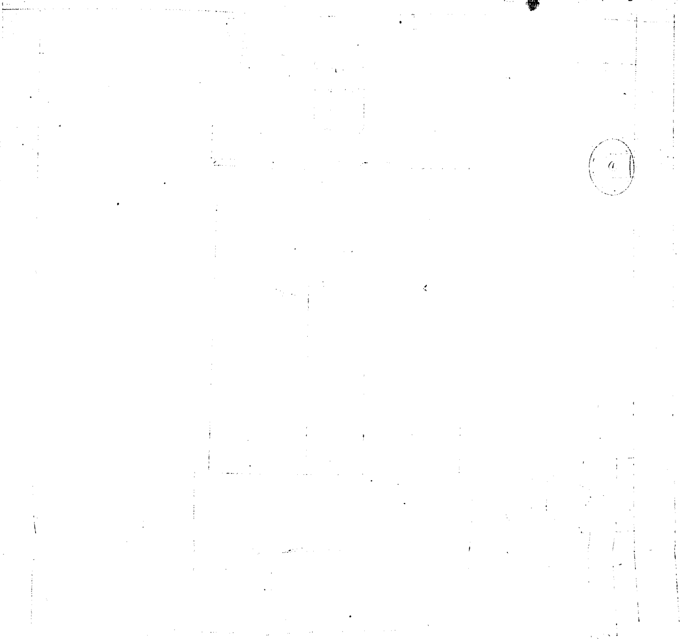
386

1 Layer of
do 1" wide
4"

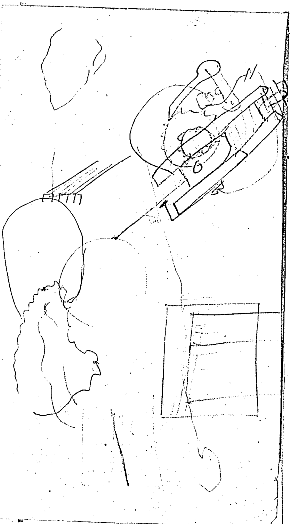
E. L. Abbetes
J. P. May 9th 79.

387/16

E. Rittmeter
[illegible]
[illegible]



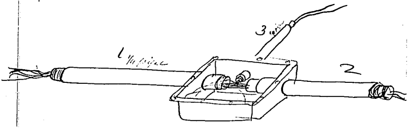
388/16



389

Patent afs model —

Kruzi make the following model to illustrate the system of carrying wires through the Hard rubber lined pipe —



~~Have~~ a top put on with soft rubber sheet to prevent water Coming in: ~~& use~~ use bolts, Make the whole of iron 1 & 2. to be with box & all. 1 foot long, 3 to be 6 inch long & smaller than 1 & 2.

TAE J Kruesi

May 20 1879

Made by Geo Jackson

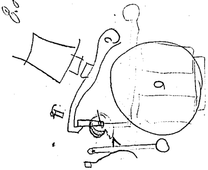
½" pipe iron [illegible] lined with [illegible] [illegible] inside)
packing water [illegible]

THE REDUCTION RATIO FOR THIS DOCUMENT IS 16:1

390

[illegible] April 20th 19[illegible]
J. [illegible]

389
16

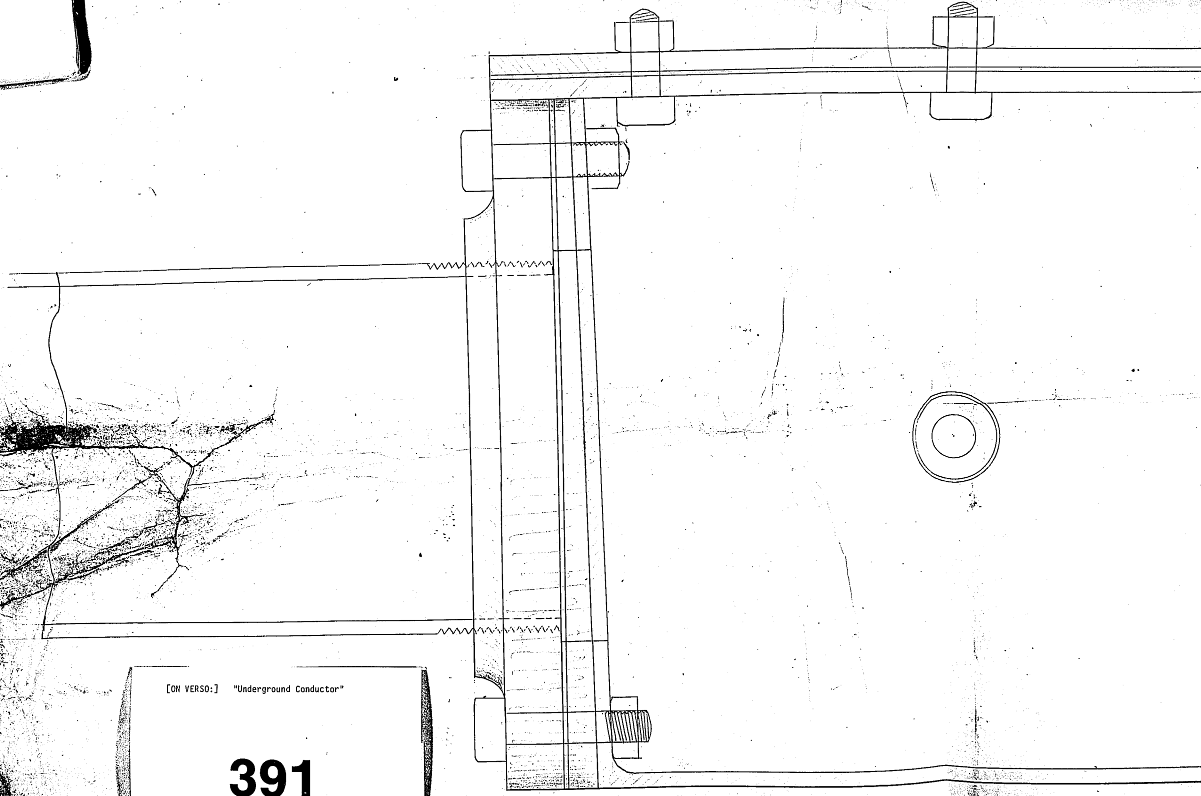


5 per cent of advance Royalties
and 500 per month = to pay 200 [illegible]
[illegible] of 300 –

500.

390
16

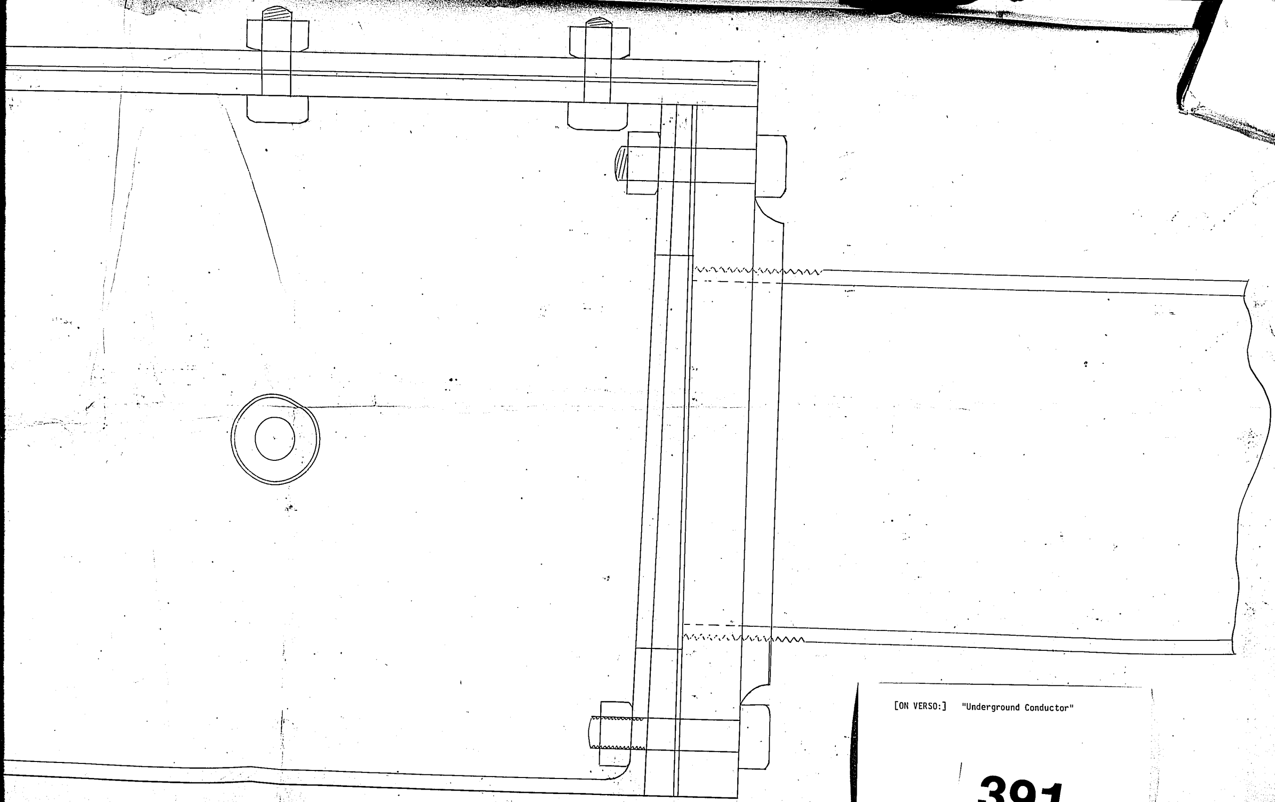
THE REDUCTION RATIO FOR THIS DOCUMENT IS 16:1



[ON VERSO:] "Underground Conductor"

391

[CONTINUED ON THE NEXT FRAME]



[ON VERSO:] "Underground Conductor"

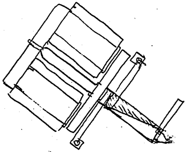
391

THE REDUCTION RATIO FOR THIS DOCUMENT IS 16:1

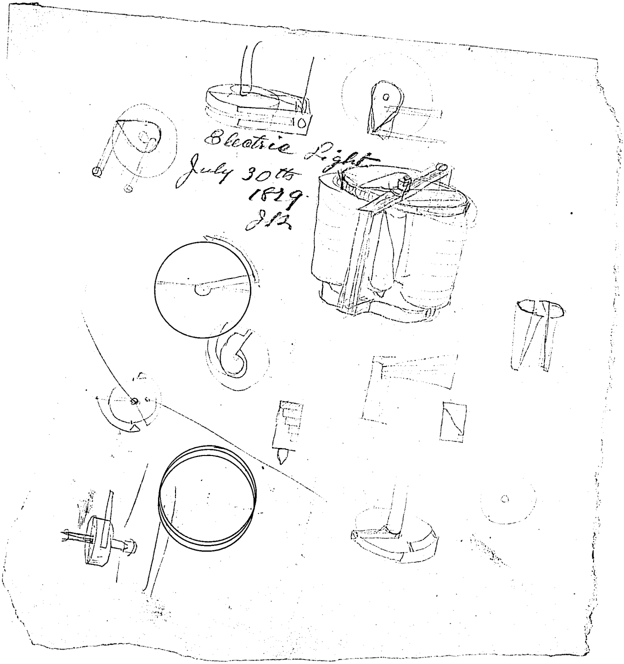
[CONTINUED FROM THE PRECEDING FRAME]

Electric Light July 29th 1879

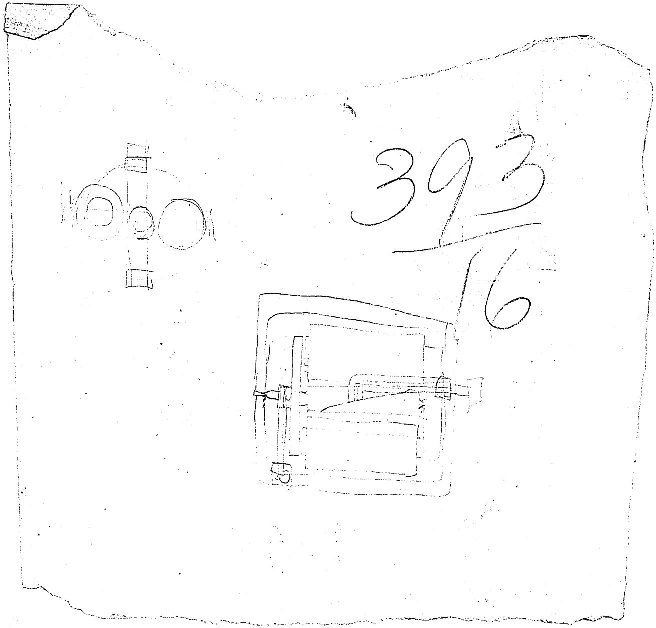
J Kruesi



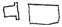
392



Electric Light
July 30th
1879
J K



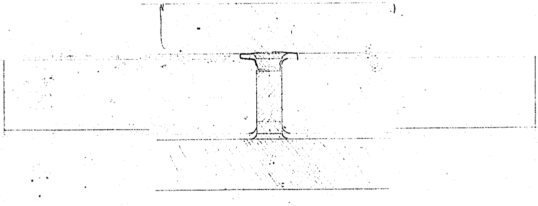
393
16

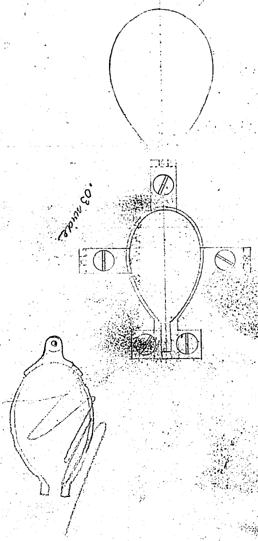


E. L.

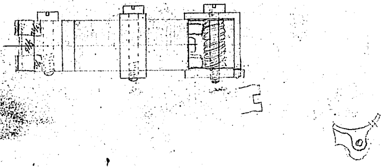
Aug 20th 29

J R

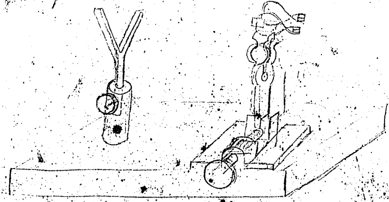


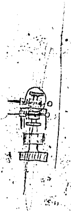


E L.
J R
Nov 20th 1829



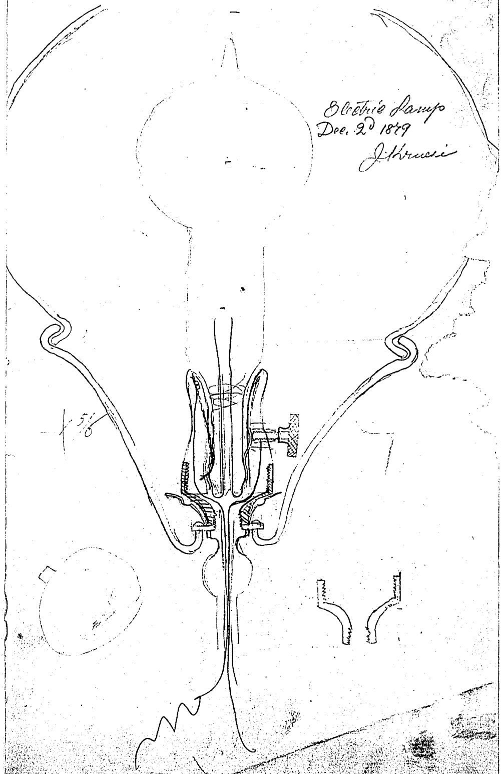
Electric Light Dec. 1st 79





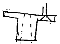
9 3/12

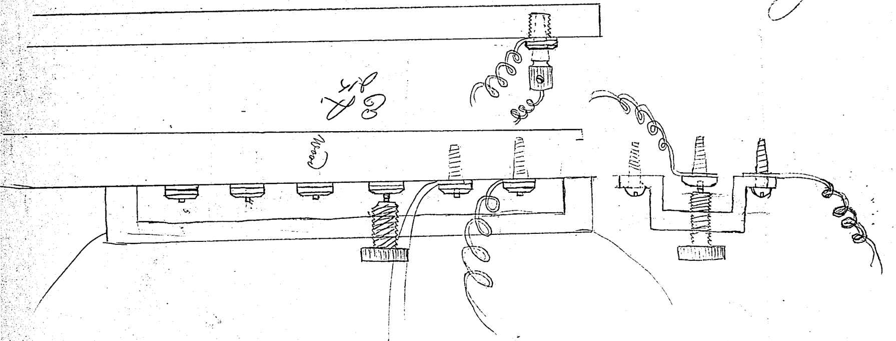
9.43



Electric Lamp
Dec. 2d 1879
J Kruesi

E L, Dec 5th 79

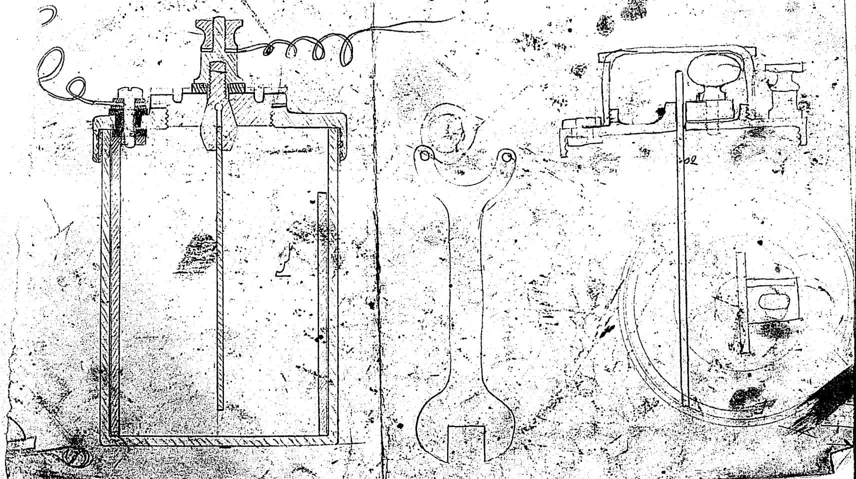




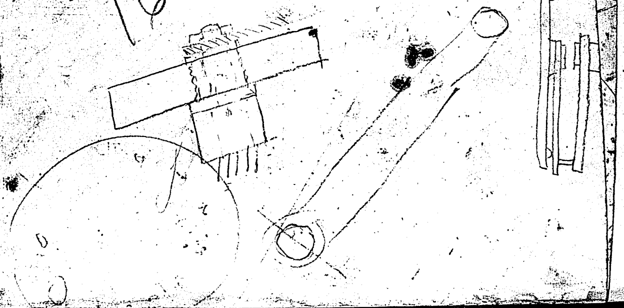
E A. 2/5

Decomposing cell for Edison's Electric Light Meter
Dec [illegible]

J Kruesi

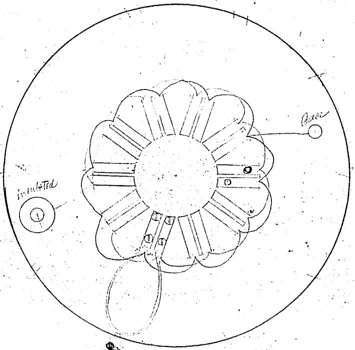


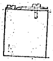
329/16



20
5
8 | 100 (12
8
20

Electric Light
Dec. 15th 79.
J.K


Base
Insulated

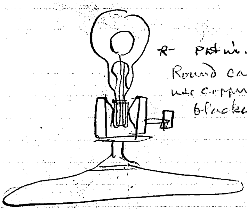


T. A. EDISON.

Menlo Park, N. J., Dec 27, 1879
JK

Kreuzi.

Make me a holder & put Lamp in for model.

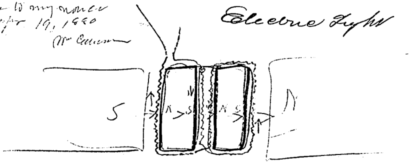


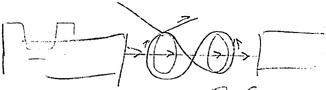
R- Put in the Round carbon use copper & blacken it

get these ready for Wilbur who will call Saturday night 7.30 pm.

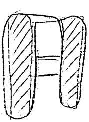
This came to my notice
again Apr 19, 1880
Wm Carman

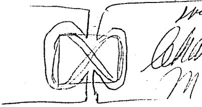
Electric Light





TAE



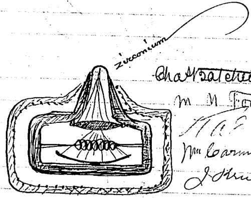


Wm Carman
Chas Batchelor
M N Force
J Kruesi

T. A. EDISON.

Menlo Park, N. J., ... 187

Electric Light



Chas Batchelor
M N Force
T A E
Wm Carman
J Kruesi

came to hand again
Apr 19, 1880
Wm Carman

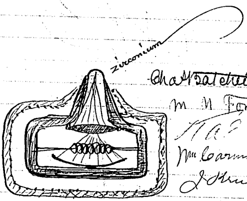
some going to [illegible]
thunder with E

403

T. A. EDISON.

Menlo Park, N. J., ________ 187

Electric Light



Chas Batchelor
M N Force
TAE
Wm Carman
J Kruesi

came to hand again
Apr 19, 1880
W Carman

some going to [illegible]
[illegible] with E

Clay

Signed by me apr 19. 1880
think this is at least 1 year back
McCaryan

Pipe clay contains neither, Iron, sand, nor Carbonate of Lime, if it burns yellow it shows Iron, increased heat burns out iron —

Variation in shrinkage 14 to 31 pc in surface. The capacity or solid contents between 20 & 43 per cent

Clay may be burnt so hard as to give sparks when struck with steel, .

Pure clay. Silicate of alumina is by itself infusible, but fusible with lime, Fe Ox & oth bases.

~~Kaolin pure Klay~~

to prevent great contraction mix with powdered burned clay —

Pure alumina - ⑩ Oxide of aluminum.
in amythest - Hone Stone,

unfusible at all temperature under that of the the O H blo pipe, cannot be scratched with file after heating — at O H B pipe. Melts to transparent globules, which assume crystalline structure on cooling

Good Alumina Crucibles: See 122, Mitchell book by Crookes

Lamp – Notes.

Lutes or cements for Lamp Globes.

Parkers –
Good clay. 2 sharp washed sand 8. horse dung. 1
intimately mix. afterwards thoroughly tempered
like mortar.

Watts – Powdered Cornish porcelain clay
mixed to consistency of thick paint with sol of borax
2 oz borax to pint hot H_2O.

Roman Cement.

Plaster Paris mixed with weak glue, milk, or
starch water –

These ~~lutes~~ 3 last lutes. stand dull red heat
may be rendered perfectly impermeable to
gaseous bodies by being smeared over with oil or a
mixture of oil & wax.

another stands 500 F.
Linseed or almond meal. mixed to consistency of
paste with H_2O, milk. Lime H_2O. or starch paste.

Lime & Egg Cement.

Just suf quant H_2O to added Quick lime, to reduce to dry powder & that mixed well & rapidly with white of Egg. diluted with its own vol of H_2O. mixture spread immediately on linen & applied to part then powdered with quick lime forms good Cement, not flexible, main defect.

White Lead mixed with oil,

Clay Lute, (Faraday) / see p 111. Mitchell Manual by Crookes.

Beales Cement.

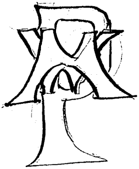
Chalk 60, lime & salt, 20 each. Sand 10.
Iron dust & blue or red Clay 5 each. grind & calcine.

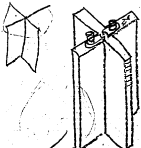
Oxychloride of Zinc Cement.

in sol Chl Zn, of 1.49 to 1.65 S.g. dis 3 pc borax or Sal am. then add ox zinc which been heated redness until mass proper consistency, the Cement becomes hard as marble, may be cast in moulds like plaster paris.

Alu

E Dr
Resistance Box

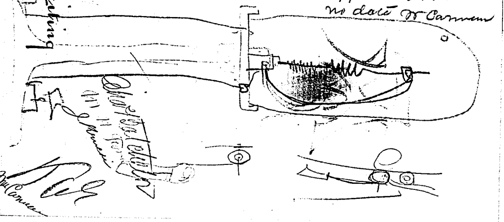




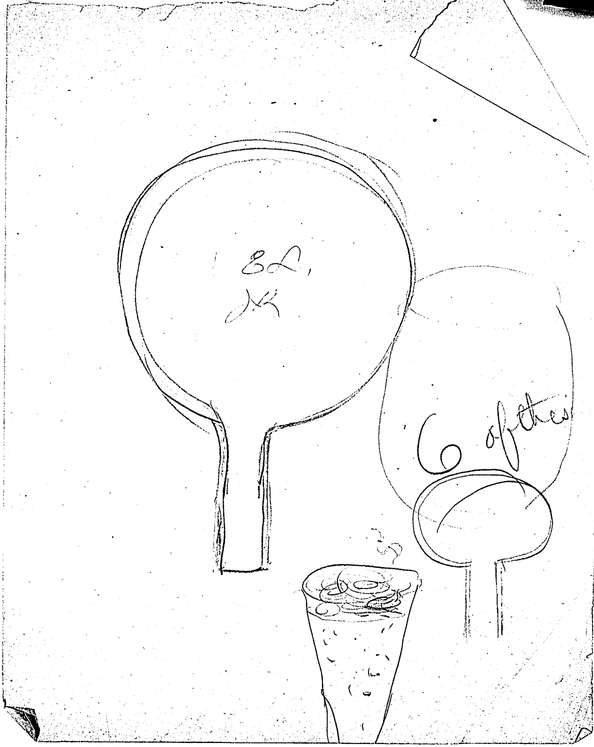
408/16

401
16

Apr 19. 1880
appears to have
no date or Carmen



Chas Batchelor
J Kruesi
Wm Carman


8L,
JK
6 of these

[ON VERSO:] "To hand Apr 19, 1880 Wm Carman"

409

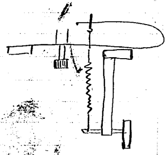
T. A. EDISON.

Menlo Park, N. J., 187

Kruesi, put in new Spiral in diaphragm one

In the spring one make the little spring that is fastened to the stirrup at least 1/4" longer in order to do this you will have to make a ~~[illegible]~~ small bracket for it bent down into which the adjusting pin goes and the other adjusting screw for slide must have small head

CB



410

T. A. EDISON.

Menlo Park, N. J., 187

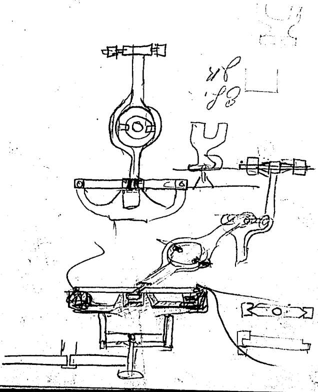
Kruesi

Design the thick spring + Iridium instrument very strong and solid as it will be shown right along to people coming here. Batchelor

Kruesi put the spirals again in these two instruments as we want them to compare with others we use

I have taken six of your small books. for some of my work

411

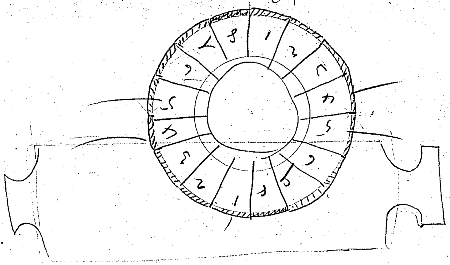


[ON VERSO:] "To hand Apr 19, 1880 Wm Carman"

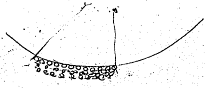
412

Am

413
16



8 l.
l 12.



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413

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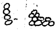
·625
·625
·140
7·015

75
4417
1000

·018
4
·072



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·0625
0625
0625
·1400
5·3275
·023
5·3350

7
100

5·327
·023
5·35

65
10
·75

65
10
·075

65

·04417 16 Coh

·4417

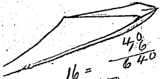
$d^2 \times$ ·7854

Drawing for Revd Cdr — 19/11/62
Mr Cummins

75
75
375
525
·5625

·5625

·04417/600
2·650200
2·650200



40
16
640

16 =
600
40
12/24·000
2·000

·075

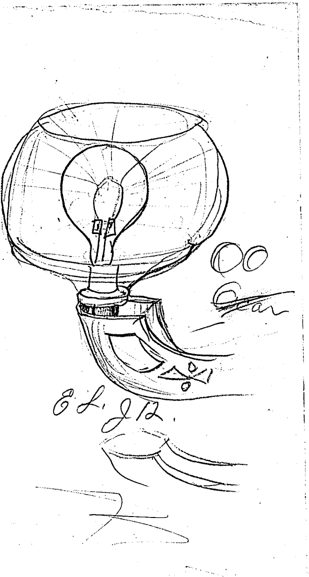
75
75
375
525
5625
1000

·075
·075
375
525
000
·05625
·7854
22500
28125
45000
39375
·04417875 0

75
25
390
156
1950

1
2·65
2·39

2·125
1·125
10625
42500
21250
21250
2·390625



[ON VERSO:] "This drawing to my notice
Apr 19, 1880 Wm Carman"

414

T. A. EDISON.

Menlo Park, N. J., ... 187

Kruesi

Also on diaphragm one put in stronger spring and put on to the rubber and under the cork a piece of mica 1 in in diameter & stiffen it up.

Fix up the six spiral one with screws top and bottom and make spring a little shorter as when hot they bend a little.

We want them screwed to plates top & bottom because they give spark in places where they are hooked on

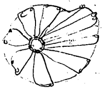
[ON VERSO:] "To hand Apr 19, 1880 Wm Carman"

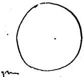
415

Electric Light

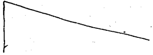
This memorandum of

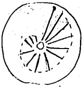
Chas Batchelor
T A E
M N Force
Wm Carman
J Kruesi

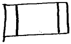


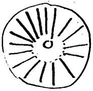


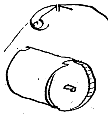
diaphragm
like the Basilar Membrane -











Electric Light

Platinum notes.

melt P
1560 to 1560 Centigrade, Becquerel

Platinum with (Carbon, Silicon, or Sulphur greatly lowered in fusibility =

Spec Gr Density varies 21.0 to 23.0 Watt - 21.25 Hammered, drawn 21.4 wire, ~~21.5~~ 21.5 (Wollaston) solidified from fusion 21.15, Deville, Debray

Melting point 1460° to 1480° - (Deville) -

Fuses in Oxhydrogen Blowpipe, Watts, Volatilized & dispersed with scintillation, absorbs Oxy in fused state (Deville & Debray)

Color silver white,

Chas Batchelor

Does not oxidize any temperature, Not attacked by any single acid - Disolves by Nitro-Muriatic acid, Corroded by heating in air with, caustic alkali or alkaline earths, consequent formation oxide, which unite with alkali

May be drawn in wires as fine as spider web - by coating with silver & drawing two together, disolving silver by N acid -

Platinum acted upon by the Caustic alkali's

Fusing Salpetre, free Chlorine, alkaline Sulphides, phosphorus, Mollen metals, & readily reducable oxides,

Manufacturers & Dealers, U.S.A - Balor — Pa, H Raynor. NY Platt & Co NY. London Johnson Matthey & Co

Heraeus at Hanau. Frères Chapuis, Desmoutis & Quennessen, Godart & Labordenave, Paris)

Electric Light

Very thin wire may be melted in common blow pipe.

Platinum frequently contains Barium or a combination of that metal (Kraut) - Osmium & Silicium, (Watts)

Atomic weight 197.4 - Pt.

R. A. E. McLauran
M M [illegible]

Welds like Iron at high temperature

wire 2 mm dia breaks with weight 124 Kilogrammes

Expands by heat less than any other metal

Unites with most metals which are more fusible than Pt viz
Antimony arsenic, Bismuth, Barium, Cadmium Copper
gold, Plat metal, Lead mercury molybdenum nickel
palladium Potassium Silver. Sodium.
Tin,

Harder than Copper softer than iron
Exceeds all other metals in tenacity except Cu & Fe
after Gold & Ag most ductile all metal,
alone it may b drawn out wire, $\frac{1}{1940}$ of inch
with Ag Ex $\frac{1}{30000}$ " beaten out thin like Gold leaf

Electric Light

Oxides of Ar antimony Te Bis Zn Cd. Sn Pb Cu & Ar, Especially if any sub be present that will combine with the O. of these oxides

Perfect welding requires white heat but they adhere at red heat

TAE

triangles of Pt. used to support crucibles in gas flame become gray & brittle, Exs. under Micro show lat longitudinal cracks penetrate deeper & deeper & become more open or as it were spongy until finally wire breaks !!!.

Chas Batchelor
M N Force
Wm Carman

Way back somewhere in 1878 Kruesi

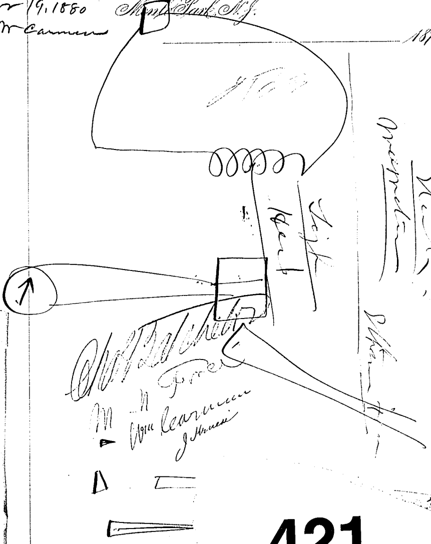
W Carman
apr 19, 1880

Laboratory of
Thomas A. Edison
Menlo Park, N.J.

Electric Light

found Apr 19, 1880
W Carman

187



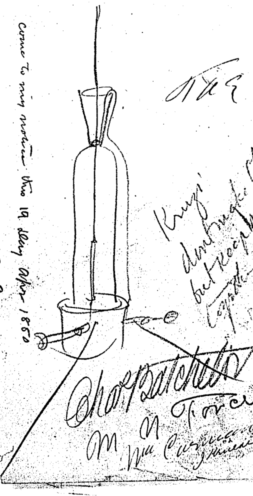
TAE

Chas Batchelor
M N Force
Wm Carman
J Kruesi

421

Electric Light

came to my notice this 19 day Apr 1880
W Carman



TAE

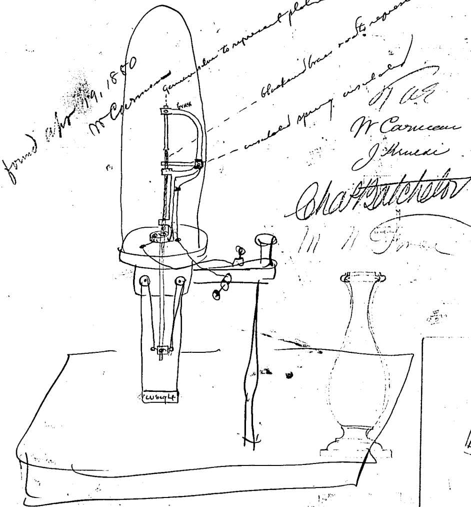
Kruesi [illegible]

Chas Batchelor
M N Force
Wm Carman
J Kruesi

420

John Ott

Electric Light

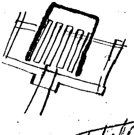

German silver to represent platina
blackened brass rods to represent Carbon
insulated spring insulated
brass
weight

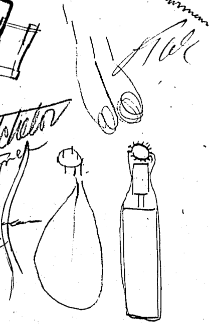
found Apr 19, 1880
W Carman

T A E
W Carman
J Kruesi
Chas Batchelor
M N Force

423

Electric Light
found Apr 19, 1880
W Carman

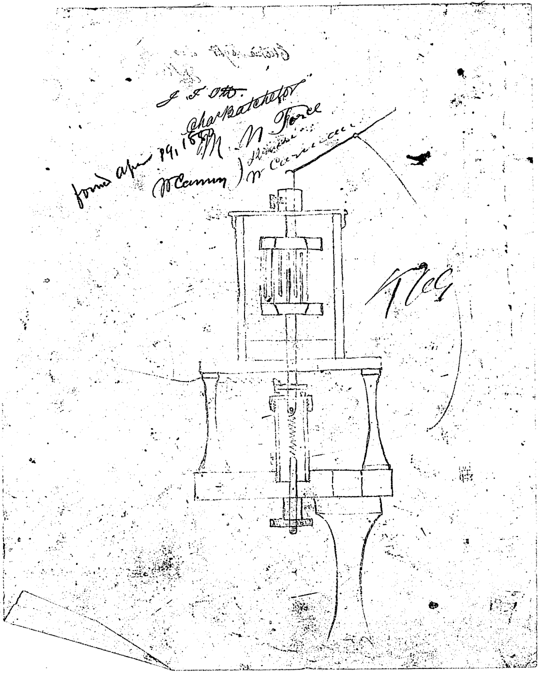




T A E

Chas Batchelor
M N Force
Wm. Carman
J Kruesi

422



J F Ott
Chas Batchelor
M N Force
found apr 29, 18[illegible]
W Carman)

4 McG

Electric Light

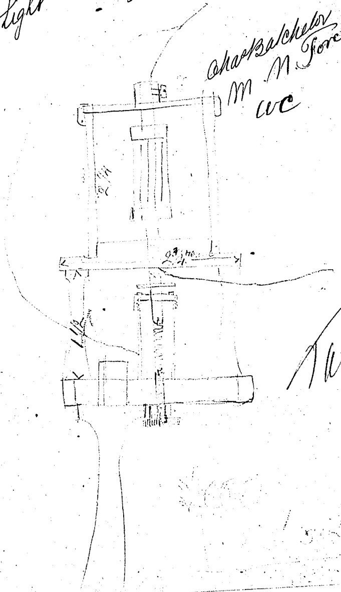
J Kruesi

Chas Batchelor

M N Force

WC

TAE

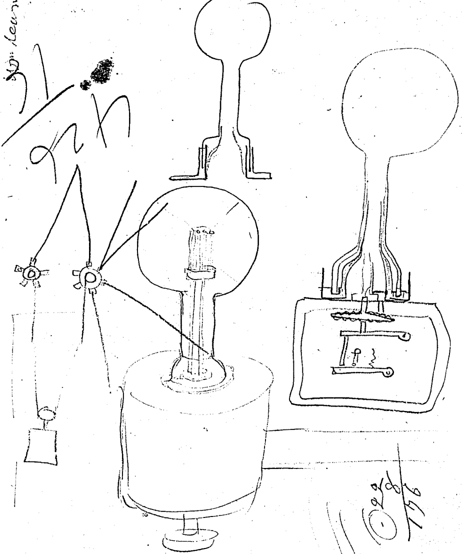

2¾ inc
1 1/2 in

[ON VERSO:] "To hand Apr 19, 1880 Wm Carman"

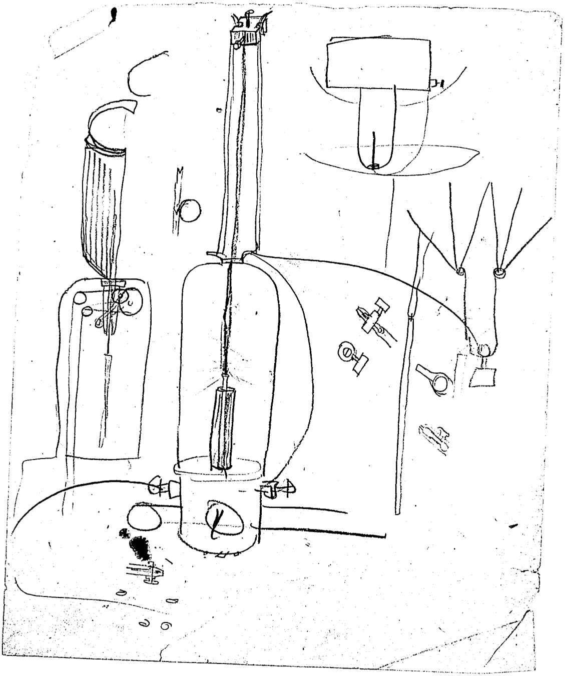
425

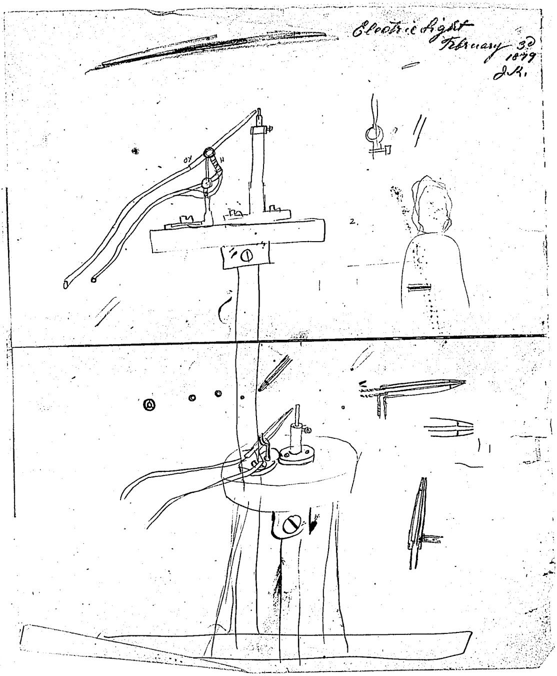
Recd Apr 19, 1880

Jno Lawson



228/176

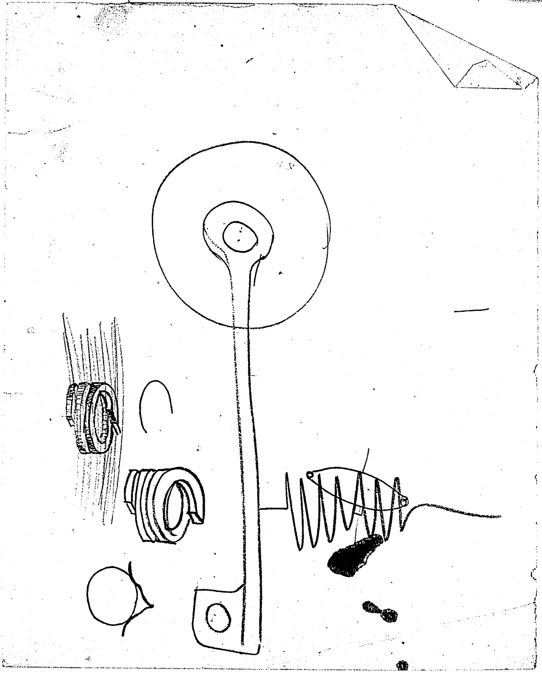




Electric Light
February 3d
1879
J.K.

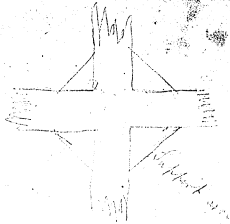
[ON VERSO:] "To hand Apr 19, 1880 Wm Carman"

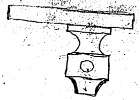
427



[ON VERSO:] "To hand Apr 19, 1880 Wm Carman"

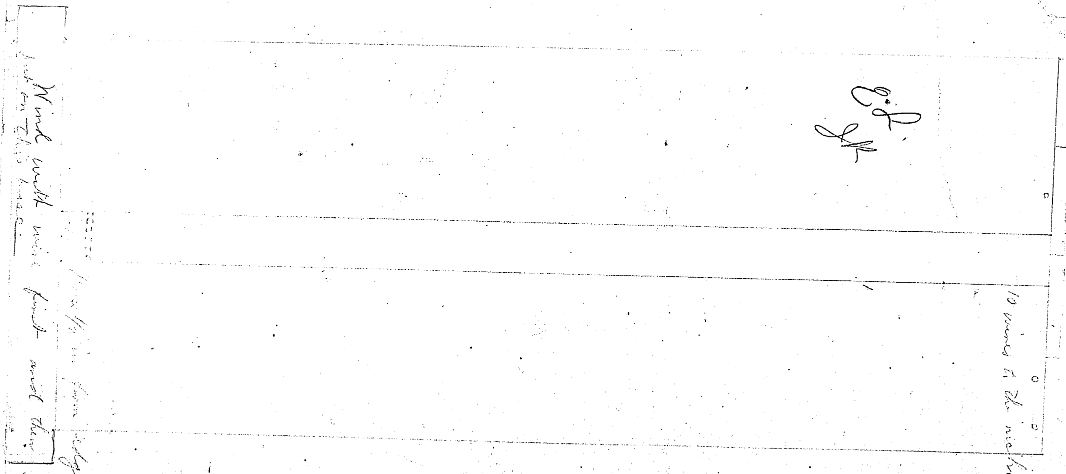
428





16
4
64
50
144) 3200 (22
288
320

35 lbs. No. 22 Cu. wire fine.



Wind with wire first and then
put on this base
10 wires to the inch

The hole to be the same size as the small boxes. 50 plugs, which may be made of brass rod, with milled heads.

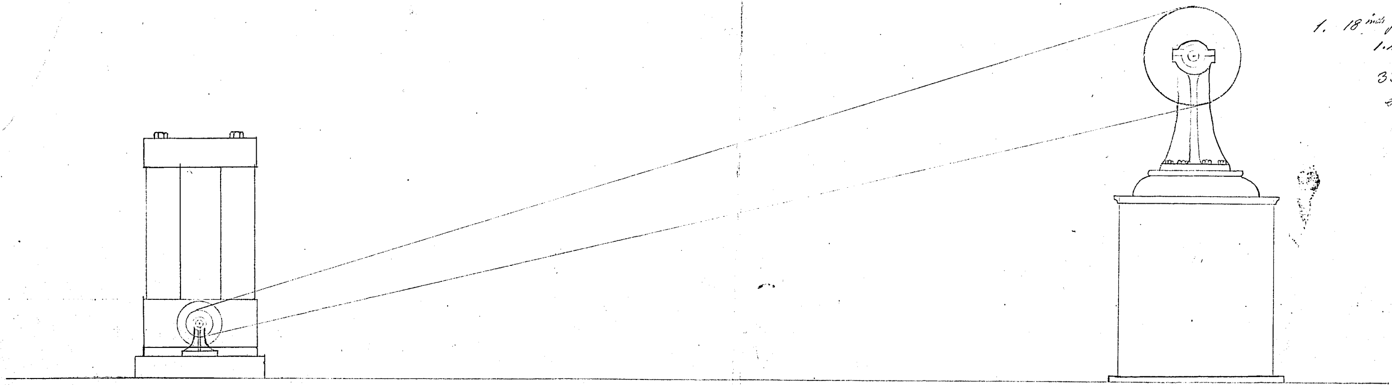
[ON VERSO:] "To hand Apr 19, 1880 Wm Carman"

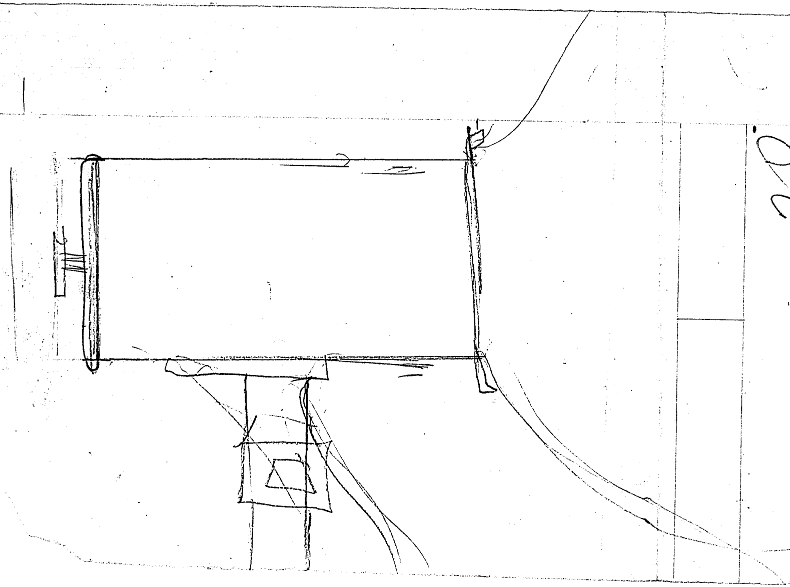
E L.
Arctic Exp.
JR

18 in on to 4
" " " " 3½ " " to

3.5 lbs of coal per Horse Power

1. 18 inch pulley 4 in face
1.4 bore
33 ft of 4 inch
single belt

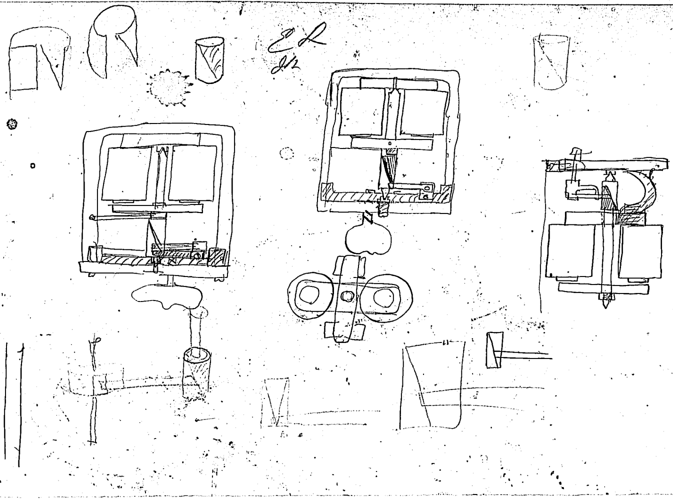




430/9

To hand Octr 9/1880
Wm [illegible]

EL
dk



[ON VERSO:] "To hand Apr 19, 1880 Wm Carman"

431

EL
dk

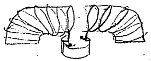
I Take out wheel & put a magnet on its place so

II Put self starter on bottom so

III Put broake springs on a pillar

IIII Put an extention on shaft for

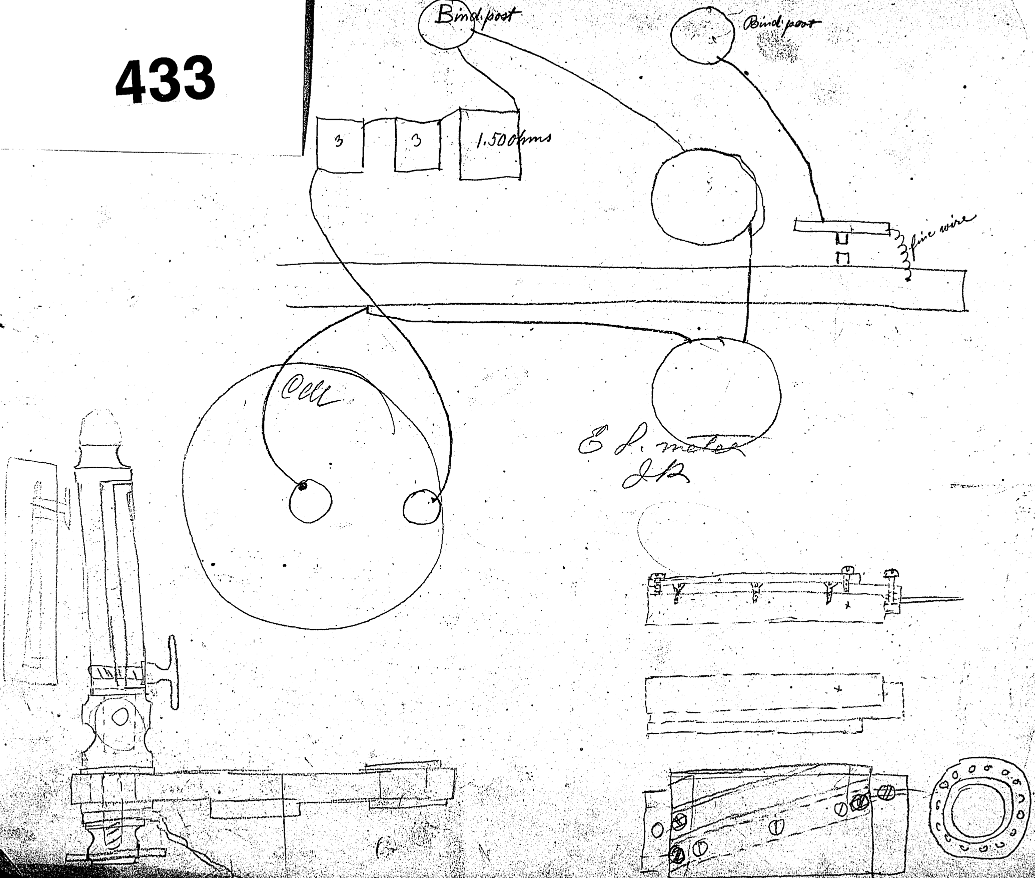
V a cap like Phelps Governor

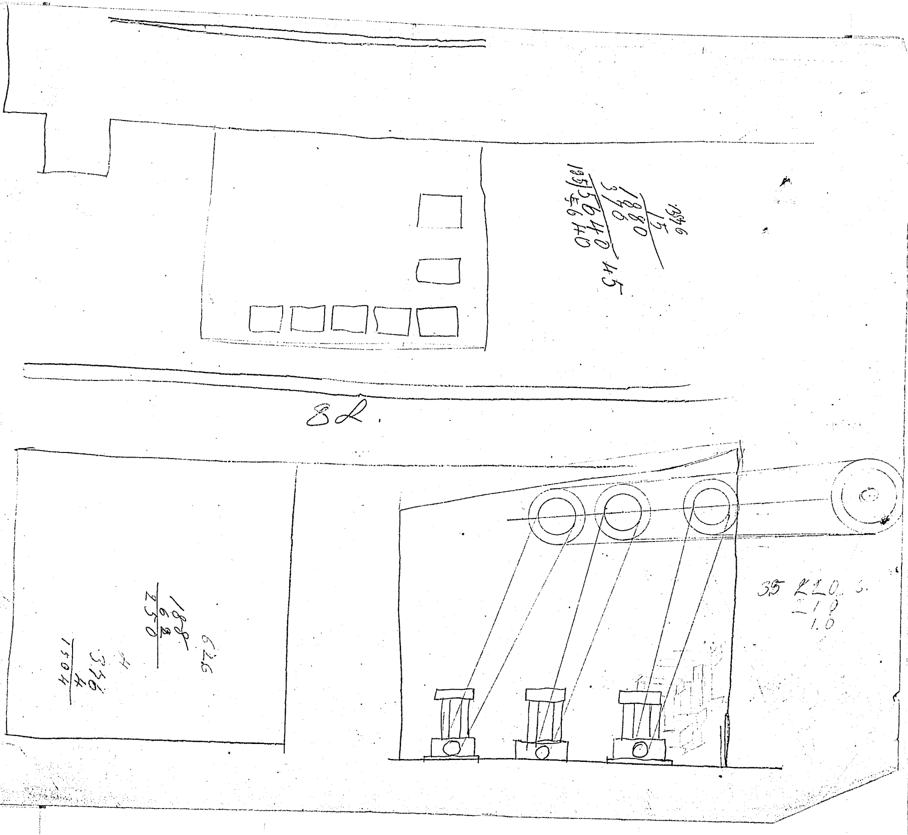


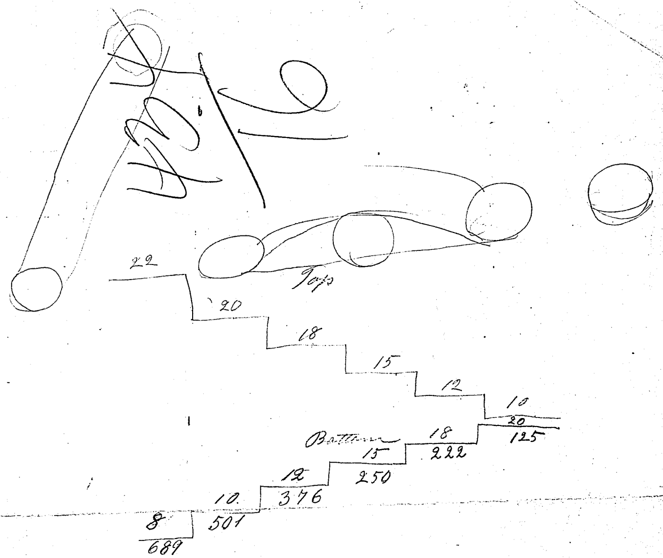
432

[ON VERSO:] "To hand Apr 19, 1880 Wm Carman"

433


Bind post
Bind post
3
3
1,500 ohms
fine wire
Cell
E. L. motor
J B


1396
15
1980
396
5640
45
195/£6 740
8l.
35 KLO 6
10
1.0
188
62
250
626
336
4
1704


420
16
22
20
18
15
12
10
Tops
Bottom
18
15
12
10.
8
20
125
222
250
376
501
689

24 18 22 8 2
2
48
48
5 0
188
4 2 4
4224
528
144)99264 = 689
998
864
1286
1152
1344
1296
50

~~24 20~~

24 18 20 10
2
48
188
384
384
48
18)9024 501.3

60
24 18 18 12
188
192
192
24
12)4512 376
91
72

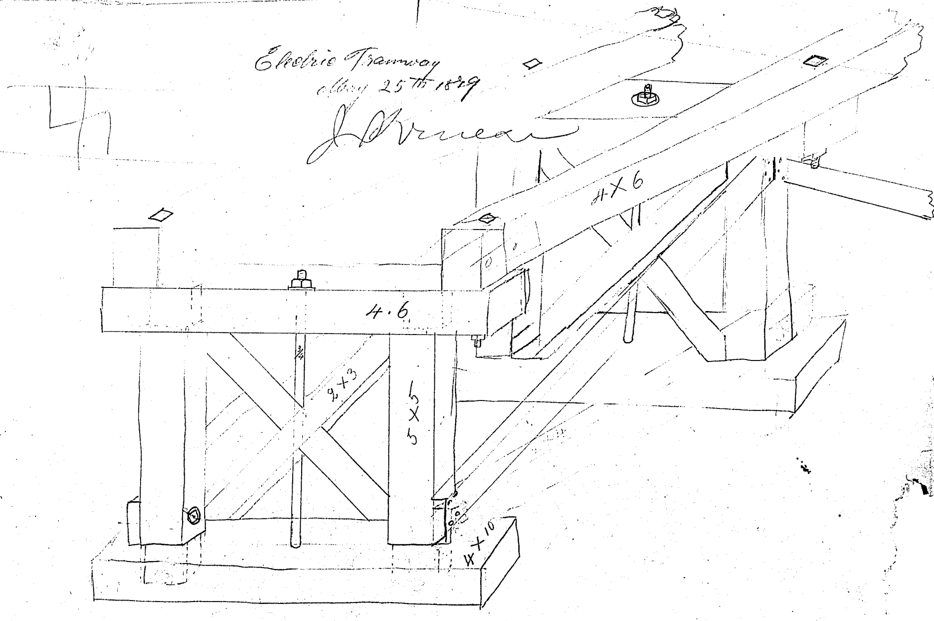
24 18 15 15
18)4512 = 250
912

24 18 12 18

24 18 18 20
36)4512 = 125
91
72
192
180
12

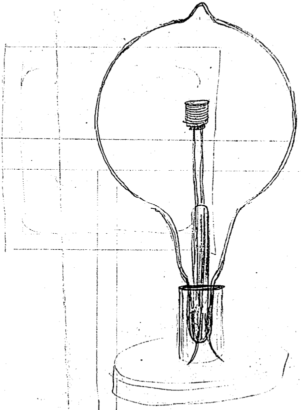
12) 4512
188
48
1504
752
36)8024 = 223.
82
104

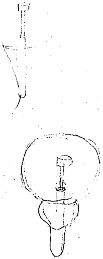
Electric Tramway
May 25th 1879
J Bruneau


4X6
4.6
3/4
2X3
5X5
4X10

435

435
16





S K Knight
Nov 13 78

Resis of Magneto Generators

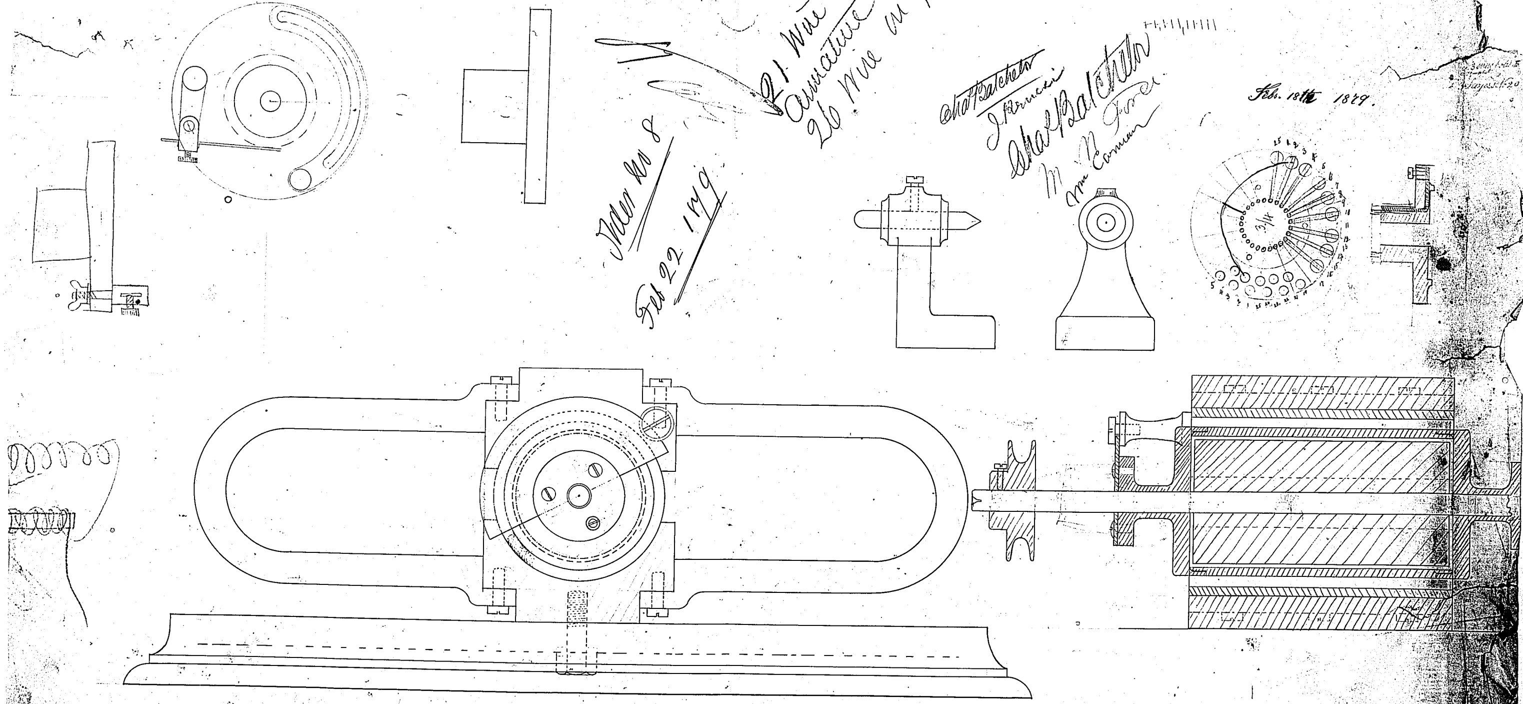
Chas Batchelor
M Carman

	Weston	Little Wallace	Large Wallace
Resistance including cond wires Machine still	$\frac{8}{10}$ ohms	6 ohms	16 Ohms
ditto Machine running slow	$\frac{8}{10}$ ohm	~~8 Ohms Current~~	~~8 Ohms Current~~

T A Edison
J Kruesi
M N Force
[illegible]

No alteration when machine reversed

Resistance of Conducting wires
Bare Copper $\frac{2}{10}$ Ohms
Kerite – $\frac{5}{10}$ Ohms



21 Wire on the armature
26 wire on shell

Folder No 8
Feb 22 1879

Chas Batchelor
J Kruesi
Chas Batchelor
M N Force
Wm Carman

Feb. 18th 1879.

437